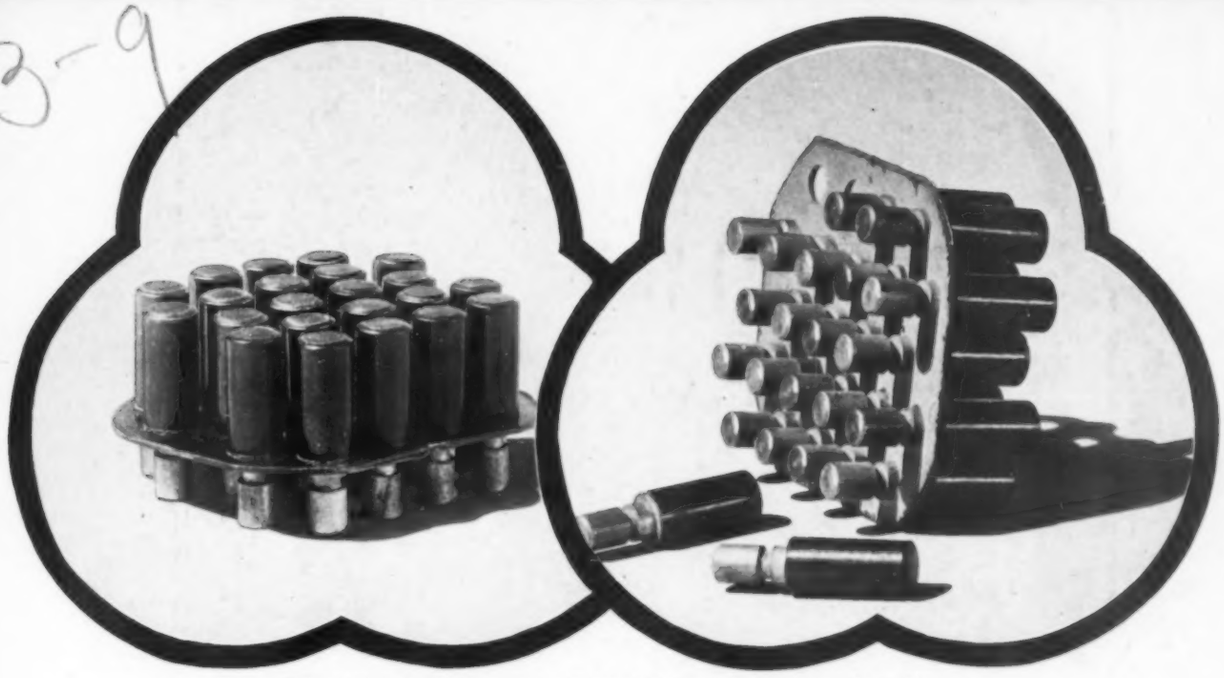

Fibre holder showing twenty-two finished pins as they come rom the mold.
Also sample pins removed from the fibre holder to show absence of fins

An ingenious, time-saving method for loading metal inserts

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The fibre holders may be loaded while the previous lot is in the press, and no time is lost in reloading.

This advertisement is the eighth of a series in which we are featuring a few fundamental rules of plastic molding. Although obvious to many, we find they are frequently overlooked resulting in a loss of time and money to the molder. By calling attention to some of these simple rudiments the Bakelite Corporation hopes to give its customers the benefit of its long experience in its endeavor to advance the art of plastic molding. Enlargements of these advertisements have been made so that they can be placed on the bulletin board in your Molding Rooms. Copies may be had upon request.

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THE MATERIAL OF A THOUSAND USES

PLASTICS. Vol. V. No. 4, April, 1929. Publication office, 49 E. Washington Avenue, Washington, N. J. Executive office, 114 E. 32nd Street, New York City, N. Y. by The Plastics Publicatinos, Inc., R. C. Gilmore, Jr., President. Subscription price, Domestic $3.00 per year, 35c per copy. Foreign and Canada, $4.00 per year. Entered as second-class mail at the Post Office at Washington, N. J., under the act of March, 1879, and copyright, 1929, by The Plastics Publications, Inc.

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WE are acquainted with several well known publishers who invest, some regularly and some sporadically, in various offerings on the stock market. None of them, apparently, suffer any ill effects in the long run, although we are certain that one or two of them have invested somewhat wisely but none too well, and all of them adopt the attitude of an all-too-precious public that they might as well "get in on a good thing". Such flyers, while they occasionaly mean a larger income tax, almost signify a lessening interest of the publisher in his main enterprise. Too many of them believe that they must go out of their way to "get in on a good thing", whereas, in reality, the good thing may be in their letter files.

It seems a reasonable cure for publishing ills, then, for publishers to invest money in the particular trades or industries they serve editorially. Is it more of a gamble to publish a paper in a certain field than to invest in one of the field's many enterprises? The trouble is that many publishers have too little knowledge of, and even less faith in, the interests they serve. If they had, let us say, a small, but rich and wholesome, industry; if they had the knowledge that that industry would progress; if they had vision enough to stick to one job, one interest; if, above all, they had unlimited faith and hope in industrial progress, they would then be more fitted to serve editorially the project they invest in financially.

Such an industry has come to birth in the plastic field. It is established on a sound basis and it is forward looking. The publishers of this periodical, therefore, are bound by faith and interest to the plastic industry. Not alone to record its activities more wisely, but because it is one "good thing" with whose certain growth they shall prosper.

PLASTICS & MOLDED PRODUCTS

A periodical devoted to the manufacture and use of plastic and composition products

Vol.5 APRIL, 1929 No. 4

Contents

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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 5 APRIL, 1929 No. 4

Light-rays and Resinoids—A Research Problem

How exposure to sunlight darkens many of the synthetic resins and the efforts that have been made to overcome this difficulty

By Charles W. Rivise

B. S. in Chem. Eng., LL. B., M. P. L.

The continued efforts of inventors and research workers in the field of the artificial resins have been directed towards the production of materials sufficiently clear to serve as substitutes for glass. The "after-darkening" of clear resinoids is a real difficulty. How some of the inventors have attempted to solve the problem forms the body of this article.

ARTIFICIAL plastics, particularly when made on a large commercial scale, exhibit a rather marked sensitivity to light. This is especially so in the presence of atmospheric oxygen. As a result it was exceedingly difficult for a long time to produce a clear light colored plastic material and well nigh impossible to prepare one that would not alter its color after prolonged exposure to light and air. The phenol resinoids have been and still are the chief offenders in this respect and many of the best minds in this field, including those of Aylsworth, Baekeland, Pollak and Redman, have wrestled with the problem of preparing a clear permanent phenolplastic. Their success has not been at all commensurate with the effort expended and there is still much to be accomplished along this line.

Light Sensitivity

There is reason to believe that a panacea for all the bad properties of the phenol resinoids including their sensitivity to light would be a method of condensing chemically pure reagents at a low temperature and without the use of heat or catalysts of any kind. Unfortunately, however, it has not as yet been found possible, and probably never will, to cause a phenol and an aldehyde to condense to a resin like substance without the aid of either a condensing agent such as a base, acid or salt, or of prolonged heat treatment. The heat treatment usually gives rise to colored oxidation products and the condensing agents not only remain behind as impurities in the final product but also cause the formation of leuco substances. These leuco substances, though themselves colorless or light colored, are gradually converted by contact with air into colored products which discolor the product. In the case of basic condensing agents, phenol salts are also formed in situ which dissociate in air and remain within the mass in its final state. Then again absolute control of the condensation during manufacture has not as yet been attained despite the great amount of research, and as a result the product usually contains an excess of one or the other of the reagents. This is particularly true if an attempt is made to remove all the water during or after the preliminary stage of the process.

For many purposes, particularly where color is not an important item, an excess of one or other of the reagents is not only unobjectionable but often beneficial. Thus the presence of free phenol renders the mass more flexible and plastic and increases its solubility in the usual varnish solvents. For this reason free phenol is often introduced intentionally into phenol condensation products intended for use in electrical insulating varnishes. Such a varnish has the further advantage of being antiseptic and vermin proof. But for most purposes

such as cigarette holders, pipestems, beads, billiard balls and piano keys where permanence of color is highly essential or indispensible, an excess of phenol is a drawback. For even pure phenol assumes a reddish or brownish color on exposure to air and it only takes a very small amount of red or brown to discolor a large batch of light colored resinoid.

Uncombined Reagents

Heating the product to drive off the uncombined reagents only serves to hasten the discoloration and hence is out of the question. Baekeland in Patent 1,018,385 dated February 20, 1912 suggests removing the impurities by washing the initial product. This method, though it does get rid of most of the free phenol, cresol and other undesirable ingredients is impracticable on a commercial scale, as the liquid used, such as water, alcohol, ether, soda, lye or acetone also dissolves a goodly portion of the still soluble resol.

In view of what has just been said it is surprising to note that in Patent 1,436,047 dated November 21, 1922, Charles Moureu suggests stabilizing acrolein and retarding its change to diacryl, which occurs in the presence of light and air, by means of either a monophenol or diphenol. Among the substances mentioned are pyrogallol, pyrocatecatechol, hydroquinone, and gallic acid as well as various natural and artificial products containing phenols, for instance tanning extracts.

"Hexa" As a Cure

It is also interesting to note that in order to avoid the formation of undesirable formose impurities, Aylsworth in Patent 1,111,288 dated September 22, 1914 intentionally forms a phenolic condensation product containing an excess of phenol. This is accomplished by utilizing less than the equimolecular proportion of formaldehyde in the reaction. After the reaction is completed sufficient hexamethylenetetramine is added to combine with the free phenol. This patent is of particular interest because it also suggests a possible method of getting rid of the condensing agent. In order to accomplish this latter desirable result, Aylsworth first makes a water soluble phenol resinoid by reacting on a phenol or a cresol with formaldehyde in the presence of an alkaline earth oxide or hydroxide such as those of barium, strontium or calcium (lime) either in equimolecular proportion of oxide or less. The product is largely composed of phenol alcohols such as oxy-benzyl alcohol. The metallic oxide is gotten rid of by neutralizing it with sulphuric acid or carbon dioxide, which causes its precipitation as a sulphate or carbonate so that it can be filtered out. A variation consists in forming a partial condensation product from phenol and formaldehyde in the presence of calcium hydrate, dissolving the product in alcohol and then precipitating the metal oxide as before.

Mixed With Rubber

Another method of making a light colored resinoid by getting rid of the impurities is disclosed in Patent 1,092,511 granted to Aylsworth on April 7, 1914. In this method compressed formaldehyde gas is forced into a closed chamber containing heated liquid phenol. The water is allowed to escape; steam is passed there through to remove the uncombined phenol; hexamethylenetetramine is dissolved in the molten mass, which is then caused to harden with the evolution of ammonia. The hardened mass is cooled, pulverized, heated again to a higher temperature, treated with a boiling caustic soda or potash solution, washed, dryed, incorporated with caoutchouc and sulphur, vulcanized and finally soaked in a caustic soda or potash solution to remove the last traces of uncombined materials.

In Patent 1,102,630 dated July 7, 1914 Aylsworth proposes to make a light colored product by mixing a phenol resin (unreactive phenol condensation product) with polymerized formaldehyde or trioxymethylene and benzoic anhydride and/or naphthalene. The phenol resin may be prepared by heating phenol or cresol or other homologue in an autoclave while pumping formaldehyde in gaseous form into the bottom of the container and stirring the mass. As soon as the reaction is completed, the steam is allowed to escape and the product is dehydrated.

In Patents 1,310,087 and 1,310,088, dated July 15, 1919 Redman, Weith and Brock take a step in the right direction by suggesting a method of making a phenol resinoid without the use of catalysts or condensing agents of any kind.

To quote the patentees:—

"Mix together 3 parts of a 40 per cent. solution of formaldehyde (CH_2O) and 5 parts of phenol (C_6H_5OH); boil the mixture at atmospheric pressure for a period which will vary according to the quantity and the precise character of the phenolic body employed, continuing the boiling usually from 60 to 120 hours, until there results a lower layer in the nature of a viscous creamy mass and an upper layer of water which is virtually free from formaldehyde, but which may contain from a trace to perhaps 2 per cent. of formaldehyde.

It is ordinarily desirable to use phenol or a phenolic body composed largely of phenol and comprising its homologues, or some of them (such as ortho, meta and para cresol), where a clear, transparent product is desired. However, cresol or a mixture of cresols may be used where a cheaper product is desired and where the question of color is not of great importance.

Ordinary commercial cresol may be used, in which case the boiling period may be shortened, so as to cover a period from four to twelve hours; and, if crude cresol be used, the period may be shortened to about two hours.

In using pure phenol, or approximately pure phenol, the reaction may be hurried by closing the still or reflux con-

denser and allowing the pressure to increase until the temperature rises to 125° C., or higher, or well above 100° C., in which case the boiling period may be reduced so that it need not exceed twelve to eighteen hours.

The mixture may be boiled until the formaldehyde substantially disappears from the supernatant water layer, and this may be done without unduly hardening the resin or gelatinizing it, so that extreme care is unnecessary in dealing with the material at this stage.

Evaporating Excess Formalin

After producing a resinous mass containing a large excess of phenol in the manner described, the mass is poured into an evaporator, fitted with a stirrer, the water being discarded. There is then added 2 parts of formaldehyde, that is, two-thirds of the original amount of formaldehyde employed, and this is stirred into the mass in the evaporating tank, the mass being, at the beginning of this operation, at a temperature of about 100° C. While stirring in the additional formaldehyde, the mass is allowed to cool to about 60° to 70° C. The mass is then boiled and "rapidly concentrated, the water evaporating and some of the formaldehyde escaping, which, however, may be condensed and collected. This heating operation may be carried on under atmospheric pressure and the temperature will rise to 115° C. or possible somewhat higher. Ordinarily, it is desirable to carry the concentration to a point which renders the mass quite viscous but still permits pouring. The boiling should be stopped before the material reaches the gelatinous state.

After the concentrating operation, there preferably is introduced into the mass a small additional amount of formaldehyde, say three to five per cent. of the mass to replace any loss occurring during concentration, and the material is poured into molds and allowed to 'set' at a temperature of about 50° C. to 100° C. After the material has become sufficiently firm or 'set,' it is removed from the molds and kept at a temperature of say from 50° to 100° C. for a period of several weeks, or several months, depending on the thickness of the mass. The material may remain in the molds for a period of several days to enable it to become sufficiently firm to be removed from the molds, depending upon the mass, temperature, etc.

After the material has been mildly heated for a prolonged period of several weeks, or several months, as the case may be, it finally becomes quite hard and may be used for such purposes as making pipe-stems, pipes, cigar-holders, cigarette-holders, etc. Where a high-grade phenolic body is employed in the manufacture, the condensation product is of amber-like color, but may have a tinge of orange or red in it. The material is, however, hard and tenacious, and substantially transparent.

Heat Treatment

The material may be given a finer color, greater tenacity and finer temper by subjecting it, after a prolonged mild heat treatment, to a higher temperature for a comparatively short period of time. In this manner there may be produced a material which may be machined, sawed, sandpapered, etc., more satisfactorily. For instance, the material after treating at a higher temperature, may be sandpapered and buffed with much better effect and at smaller cost, as gumming of the sandpaper or buffing material will thereby be largely obviated.

The preferred method of eliminating the orange or reddish color or tint, which the product may have after the prolonged mild heat treatment, is to continue such mild applicatioin of heat until the material is practically anhydrous and quite hard and capable of being used commercially for the manufacture of pipe-stems, cigar-holders and the like, and then subject the block of material, in a kiln, to a temperature above 100° C. for a period of several days. It is preferred to employ a temperature of approximately 125° C. for this auxiliary heat treatment, although it is practicable to range to a temperature as high as 150° C. or higher, but unnecessary to exceed 150° C. This results in the production of a clear amber, or light lemon color, and produces a material which works more easily, tools better, possesses "higher tensile strength, is finer tempered, and may be sandpapered and buffed with greater facility. It is probable that some colloidal change takes place in the material during this treatment, which improves the product, giving it a finer color, a better temper, and increased tensile strength.

The material produced in the first step of the process, which contains a large excess of phenol is soluble in the usual solvents, and at a temperature of about 100° C., may be poured or discharged with facility into the evaporator. The material, after concentrating with a second supply of formaldehyde, molding, and hardening by prolonged mild heat treatment, is practically infusible and insoluble, but, as stated, its qualities may be improved by the subsequent heat treatment at a higher temperature. After such subsequent treatment, the material remains, of course, insoluble and infusible.

Another Way

In the second stage of the process one may add to the formaldehyde a very small proportion of hexamethylenetetramine, say, 1/10 of one per cent. of the amount of the formaldehyde in the solution. This will result in the production of a material which 'sets' more quickly.

In the first step of the process, one may use 30 cubic centimeters of a 40 per cent. formaldehyde solution and 50 cubic centimeters of phenol; and in

(*Continued on page 211*)

Preforming Press Combines Toggle and Hydraulic Principles

To prevent damage to the toggle by over load, and to insure uniform pressure, small liquid-filled cylinders are provided

A form of press which evidently is suitable for tabletting, especially where very dense tablets are to be produced, and which may be used as a preforming press, is described in minute detail in a patent issued to Ralph L. Seabury, of Toledo, Ohio. (U. S. Patent 1,687,995; Oct. 16, 1928).

Ordinarily presses of the above type are mechanically operated from a crank shaft, and although the size of the article which it is desired to produce largely governs the pressure required, it has been found that generally twenty tons per square inch is sufficient. It will be apparent that tremendous power must be developed to exert such a pressure, and should a greater volume of material be placed in the mold, the machine will stall or, as frequently happens, when the machine is very powerful, the mold becomes broken. It is further observed that in the event there is a smaller quantity of material in the mold, the article formed is less dense while, on the other hand, if a larger quantity of the material is supplied to the mold, the article formed is more dense. Thus, there is lack of uniformity in the articles produced.

Definite Pressure

Objects of this invention are to overcome the above difficulties; to provide a machine for compressing powdered material by which a definite predetermined pressure is effected irrespective of the distance the pressure member travels; and to provide such machine which holds the pressure member in advanced position momentarily before commencing its return.

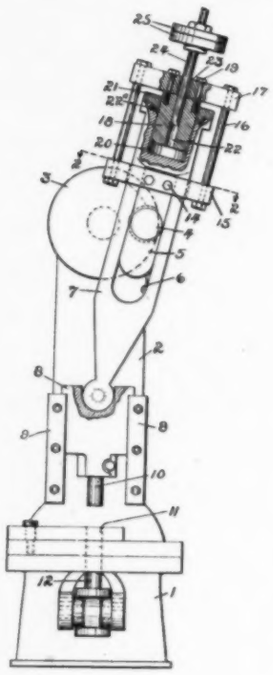


Figure 1

Figure 1 is a side elevation of a press embodying the invention; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a view similar to Fig. 1 with the press turned at right angles and with the connecting rod and slide in section; and Fig. 4 is a side elevation of an alternate form of the machine.

The press has a base 1 on which is mounted a machine frame 2, on the upper portion of which is located a driven wheel 3 having a crank pin 4. Any suitable source of power may be provided for driving the wheel 3. Reciprocated by the crank pin 4 is a slide 5, which travels in a slotted guide 6 in a connecting rod 7 is pivotally connected to a cross-head 8, which is vertically reciprocable in guides 9. Carried by the lower end portion of the crosshead 8 is a plunger or pressure member 10, which is adapted to enter a mold 11 in which powdered granular material may be placed. A lower punch 12 is reciprocable in the mold 11 and this member may function to eject the mass from the mold 11 after being compacted. Any suitable mechanism may be employed for actuating an arm 13 for imparting ejecting movement to the punch member 12.

The slide 5 is connected by bolts 14 to a yoke 15, which is connected by means of rods 16 to yoke 17. The yoke 17 carries a piston 18, which is connected thereto by bolts 19. The piston 18 extends downwardly from the yoke 17 and into a cylinder 20 formed in the upper end portion of the connecting rod 7, a gland nut 21 being connected to the outer end portion of the connecting rod 7 and holding the packing 22^a securely in position to prevent leakage between the cylinder and piston 18.

The piston 18 is provided with a central bore 22 which registers with an opening 23 in the yoke 17. Extending through the opening 23 and into the bore 22 is a plunger 24, having one or more weights 25. The cylinder 20 may be supplied with liquid, such as water, and in the operation of the press, when the connecting rod 7 is forced downwardly by the crank 4 and slide 5, it will be seen that this action takes place through yokes 15 and 17 and the piston 17 exerts a force against the liquid in the cylinder 20. It will thus be seen that a yieldable connection is provided between the crank pin and plunger or pressure member 10 and when the force exerted by the crank pin 4 exceeds a predetermined maximum (this maximum being de-

pressure exerted by the piston 18 in the cylinder 20 overcomes the resistance of the weights 25 and forces the plunger outwardly in the bore 22. In this manner, a definite pressure is obtained at each stroke of the plunger 10, regardless of whether a lesser or greater quantity of powder is supplied to the mold 11. In practice, the space between the end of the piston 18 and the bottom of the cylinder 20 permits sufficient movement to take care of the variations caused by unequal feeding of the powdered material.

Operation

In operation, the crank pin 4 turns to its lowest point while the punch or plunger 10 is compressing the powdered material. Near the end of the stroke, the compression of the powdered material is complete, and, as the crank pin continues over dead center, it carries the slide 5 with it, and, owing to the above described connections, forces the piston 18 more deeply into the cylinder 20. This action against the liquid in the cylinder, forcibly moves the plunger 24 outwardly, and in this manner the crank pin has been permitted to descend in the final part of its stroke without forcing the punch or pressure member 12 to further compression. As a matter of fact, when the crank pin 4 passes over dead center and also slightly before and after this movement, the action of the punch 10 has been regulated by the amount of weight on the plunger 24 acting on the piston 18. This feature has been found to be of considerable importance as it permits a slight dwell of the punch 10 during the period of maximum compression. This is of a particular advantage when using powders which are bulky, and as a consequence, require the elimination of a large quantity of air, because otherwise, the molded piece is apt to break open as soon as the pressure is relieved, due to the air which did not have time to escape, and became imprisoned in the molded piece.

In the alternate form of the invention shown in Fig. 4, the machine frame 27 is substantially E-shaped and is provided with a rotating table 28 having mold cavities 29 in which the material is compacted. The ejector punch 30 may be mechanically operated through links 31 and 32 by a crank pin 33 on the driven wheel 34, which may be rotated by any suitable source of power.

The pressure punch 35 is vertically reciprocable in the machine frame and extensible into a cavity 29 in the table 28, an abutment 36 forming a shoe against which the punch 35 operates. It will be understood that an article is first compressed, and, during such compression, the punch 30 operates to eject a formed article at a point opposite from the point of compression.

For reciprocating the pressure punch 35, a toggle mechanism is provided which consists of links 37 and 38, the link 37 being pivotally connected to the punch 35 and the two links being pivotally connected together and to the crank pin 33 by a link 39, the link 38 being connected at its opposite end to a piston 40.

The piston 40 reciprocates in a cylinder 41, which is connected by a passage 42 to the accumulator cylinder 43, which is vertically disposed and in which is mounted the accumulator piston 44, which is provided with weights 45. Liquid is disposed in the passage 42, and it will be understood when sufficient pressure is exerted by the piston 40 against the liquid in the passage 42, the accumulator piston 44 will be elevated. From the above description it is apparent that movement of the crank 33 operates the toggle through the connecting link 39, the punch 35 is forcibly pressed against the shoe 36, thereby causing the powdered material within the cavity 29 to be compressed. Since one member of the toggle rests upon the hydraulically operated piston 40 the pressure developed will always be the same regardless of the quantity of powder which happens to be introduced into the mold cavity 29. Another feature of outstanding importance resides in the fact that an appreciable dwell is secured during the period of maximum compression, which permits escape of entrapped air so that the piece after being formed will not be disrupted when pressure is relieved.

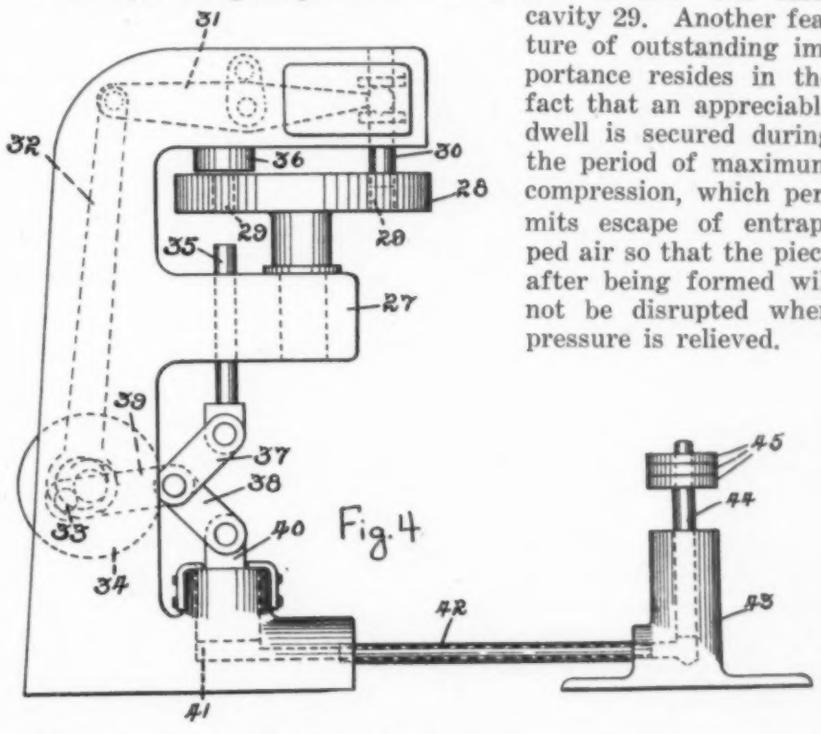


Fig. 4

Artificial Resins in their relation to the paper industries, By Charles W. Rivise will appear in the May issue

Shock-resistant Plastic Combines Resinoids and Rubber

The resilience of soft vulcanized rubber is depended on to cure the inherent brittleness of the phenoplastics

A combination of soft vulcanized rubber as a filler with a phenoplastic binder is somewhat of an inovation in the plastics field. The presence of moisture in some of the fillers hitherto used in plastics lowers the electrical insulating qualities . Also, many of the mineral fillers when combined with phenoplastics yield comparatively brittle products. A recent invention aims to correct these conditions by employing soft vulcanized rubber as a sort of filler.

The invention, as described by Mr. Carl Kulas, of Leipzig, Germany, in his recent U. S. Patent 1,688,500; Oct. 23, 1928, covers the following salient features:

Differing Properties

Resol, which is the initial condensation product of phenol-formaldehyde reaction, and rubber are, each, in the hardened or vulcanized state especially well adapted for use as electric insulators. The physical properties of these two substances are radically different, because resit which results from hardening resol is a very hard body, while vulcanized rubber is a soft elastic body. However, these two substances have the characteristic, in common, of being excellent insulators for electrical purposes.

The combination of these two substances results in the production of a new substance which not only combines the several virtues of the constituent substances but greatly exceeds these in excellence of mechanical properties and value as and electric insulator.

To produce the product there are mixed together 50 parts by weight of resol and 50 parts by weight of any suitable solvent such as denatured alcohol or acetone, or the like. This mixture is stirred either hot or cold until the resol has been acetone, or the like. The mixsulting mass is a viscous resol solution to which there is added either 100 parts by weight of pulverized rubber scrap or waste, or a mixture of 50 parts by weight of rubber scrap or waste and 50 parts by weight of any desired filler and coloring matter. The entire mixture is caused to boil lightly, and is constantly stirred (preferably in a closed vessel provided with a reflux cooler) until all the constituents have been intimately mixed together and a rubber like plastic mass results.

The solvent which was used for dissolving the resol is recovered by distillation, and may be reused after being freed of rubber and filler particles, and of any other impurities which it may contain.

Calendering

At this stage of the method the resol-rubber mass has been freed of the greater part of its liquid content, and for the purpose of rendering the mass homogeneous and freeing it of any remaining volatile constituents, the mass is passed at a rapid rate in thin layers through a calendering machine the temperature of which is slightly higher than the boiling point of the solvent which was used to dissolve the resol.

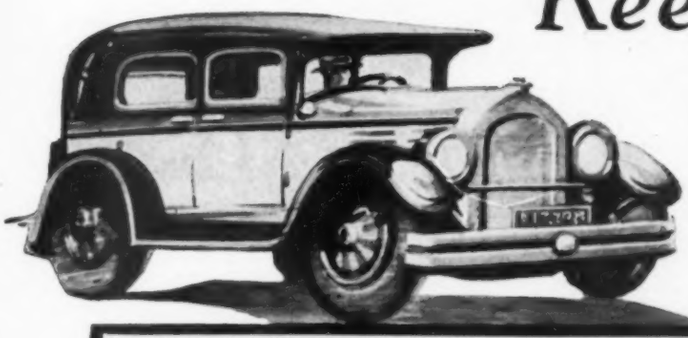
Thereupon the product is placed in a moderately heated chamber, the temperature of which is slightly higher than the boiling point of the solvent which was used to dissolve the resol.

Thereupon the product is placed in a moderately heated chamber, the temperature of which is about 30 to 40 degrees Celsius, and is permitted to remain there for about fourteen days. Throughout this time the temperature within the chamber is maintained constant, thus initiating and carrying through a reaction which promotes the seasoning and plasticity of the mass and conditions it for the subsequent treatment by which the mass is converted into a hard material. While the mass is in the heated chamber, and at the end of the seasoning period, its consistency is somewhat like that of unvulcanized rubber and it may be subjected to further treatment in the same kinds of molds and presses, and with the same kinds of tools, as unvulcanized rubber, for the purpose of producing the desired final forms.

After the mass has been formed or molded into articles of the desired shapes and sizes, the articles are placed into a drying chamber, the initial temperature of which is about 60°. C. Dependent upon the shapes and sizes of the articles, the latter may rest in the drying chamber in forms or molds or may be unenclosed in molds. The articles in the drying chamber are hardened by gradually raising the temperature in the drying chamber from the initial 60° C. to about 160° C. without the application of any mechanical or air pressure, until the required sub stantially infusible and insoluble condition of the articles has been attained. The duration

(*Continued on page 207*)

Keeping Pace with Industry.



"Laboratory control is perhaps one of the most important essentials to insure uniform quality for plastic material. The Fiberloid laboratories are equipped with the latest scientific equipment. The Directors of this division not only have had technical experience, but practical experience as well. They understand the problems of the large users of pyroxylin plastics.
Whether you need sheets, rods, or tubes, Fiberloid is prepared to meet your particular individual rquirements."

The Fiberloid Corporation

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Room 1512 No. American Building

When writing The Fiberloid Corp., please mention *Plastics*

The Laws of Plastification in the Technology of Raw Materials and Plastics

Many substances can be endowed with plastic properties by mechanical means

By Otto Manfred and Josef Obrist

IT has been shown by us in earlier articles (see italic printed item in adjacent column) that the mechanical and physical properties of many of the so-called plastic materials are closely related to the treatment that these substances have undergone during their manufacture. This phenomenon is particularly marked in the case of the organic materials, where not only the size of the particles but their shape plays an important role in the final property of the products.

Any mechanical working of the raw material during which there is any flow definitely in a given direction, as for example in extrusion through an extrusion press, rolling, pressing, and even when merely stirring a relatively viscous mass, will cause the ultimate particles thereof to undergo a definite orientation as to each other, and this usually leads to a certain amount of interweaving and felting so that the product will have a well developed increased strength when broken in a certain direction. This is even found to be true when the particles are fairly large and when the orientation has been effected by shaking or tapping. In other words, other things being equal, the mechanical, and especially the elastic, properties of a plastic material are closely related to the mechanical work of orientation that has been expended on its particles. The importance of this in the development of modern plastic materials should be obvious.

W. de Visser, in a Dissertation, at the University of Delft (1925), has made a study of the influence of calendering on pelts of casein gels (casein solids), and has found, despite the differences in water-content of the materials tested, that, with fairly constant water-content, that the average breaking strength of the material differed across the flow-line of the calendering as contrasted to the strength in line with the direction of the calendering it was 44.6 kilograms per square centimeter and across only 35.6 kilograms per square centimeter. This difference is also very noticeable in the case of casein solids hardened with formaldehyde, for this agency fixes the differences and makes it possible to study them later. In the case of extruded casein rods, which had no further treatment than the extrusion, which of course thoroughly oriented their particles, had an average breaking strength of 30,000 kg. per sq. cm; whilst plates made from the same rods by placing a number of them into a press and combining them under pressure had a strength of only 25,000 kg. per sq. cm. In the latter case some of the effects of the orientation had been destroyed by the subsequent pressing.

During 1927 and 1928 we have brought a number of articles by the present authors on the specific phases of the subject of the effect of mechanical working upon the properties, especially the elasticity, of the various types of organic as well as inorganic plastic materials. These articles have appeared in PLASTICS for November 1927, Vol. 3, p. 591; and for the year 1928, Vol. 4 in March, p. 131; April, p. 189; May, p. 252; June, p. 318; Aug. p. 431 and Sept. p. 494.

The following is a somewhat condensed account of an article that has appeared in the German publication Zeitschrift fur angewandte Chemie, September 1, 1928, Vol. 41, p. 971 to 977., and summarizes the results obtained, and attempts to draw certain definite conclusions that may serve to direct further work along this line.

Difference in Pressing

A still more striking proof of this theory is adduced by the behavior of a plate of *"Glorith"*, which is made by pressing finely pulverized casein in a press, first forming a rather thick sheet which is then by further pressure brought down to the desired dimensions. Such a plate has its particles oriented by the gradual flow of the material from the center of the plate outward. The values obtained with this plate (taking the maximal bending strain as a basis of comparison) was,

Along the center line
170 kg./sq. cm.
Vertical to the center line
970 kg./sq. cm.
or a difference of over 600%.

The authors then discuss similar differences noted in connection with the manufacture of paper and in the artificial (viscose) silk industries. The same relations were found to exist in the various products prepared from rubber, and the so-called "dead working" of rubber is described and explained on this basis.

The results of pouring casting-resins of the phenolic type also brings about the same kind of orientation, but as the details of this have already been described in our pages (see list

(*Continued on page 210*)

World Progress in Synthetic Resins

A concise resume of all of the patents issued in this field by the various large industrial countries during the past four years

By Dr. Aladin

THE art of preparing artificial and synthetic resins has made great strides in the past few years. While no new reactions have been discovered that would lead to novel types of resins, the better known classes of resinoids, such as the phenol-aldehyde condensation products, the urea-formaldehyde resins and the *"glyptal"* type of resins have been thoroughly exploited, whilst some of the other groups have been more or less neglected, and, in some instances, have been entirely abandoned. An examination of the patents issued within the past five years shows that the phenol-aldehyde type of resins still maintain their leadership in the field. In Germany, during the past year, definite steps have been taken in the employment of the synthetic resins for the construction of apparatus and equipment for the chemical industries. Near the end of 1928, Lebach delivered a lecture on the subject before the Verein deutscher Chemiker (Society of German Chemists) from which the following information is derived.

In Chemical Industries

At present the utilization of resinoids in chemical industry is confined to the phenol-formaldehyde type of products exemplified by *Bakelite*. The pure resins, which are somewhat like glass in their nature, are at present only used for the construction of laboratory apparatus, as they must be produced by casting and by thereupon machining and drilling the solid blocks thus obtained. By the addition of suitable fillers, preferably of fibrous nature, the molding of larger objects for this purpose has been accomplished. As this requires operations in an hydraulic press, under very high pressures, (on the order of from 100 to 200 kg. per sq. cm), and as the molds are quite expensive, the size of the articles is naturally limited, and the cost, unless the production is to be on a very large scale, still quite high; hence only relatively small objects are being molded.

For the production of larger pieces of apparatus, methods of coating metallic vessels, by using processes that resembling enameling, and in which the hardening of the resinoid layers is accomplished by heat, have been successfully developed and applied. However, the apparatus is only suitable for comparatively low temperatures. The so-called *Haveag* process, which employs a mixture of acid-proof asbestos and a special type of acid-resistant phenol resinoid, leads to the production of relatively large objects without the employment of hydraulic pressing machinery. The patents that support this process are discussed in brief in the present article and comprise: German Patent 437047 (No. 162 in the numerical list of the subjoined patents), German Patent 466429 (No. 163); French Patent 635-399 (No. 198) and Swiss Patent 119461 (No. 211. The Haveag mass can be formed in open molds and is converted without the use of pressure into the fiinal products, which exhibit good mechanical properties and are resistant to many chemicals and acids. The material has high mechanical strength, while having the remarkable low specific gravity of only 1.6. Containers for shipping acids and the like, of the size of the usual tank cars, have been made, and in such a tank car the savings in weight alone is 2,000 kilograms (4,400 lbs.). The *Haveag* material is resistant to sudden changes in temperature, has a perfectly smooth surface, so that it may even be

(*Continued on page 202*)

PLASTICS considers itself fortunate in having the privilage of presenting to its readers, as an original contribution, a concise resume of the latest patent literature on the Preparation and Application of Artificial Resins. This large and comprehensive compilation covers all of the patents that have issued in the various civilized countries that issue a large number of patents. These include, besides the United States: Canada, Denmark, Germany, England, France, Holland, Norway, Austria, Sweden and Switzerland.

Earlier compilations by the same author have appeared during the past five years in our German contemporary, KUNSTSTOFFE. However, the present article was especially prepared by the author for publication in PLASTICS, and we shall, commencing in April, bring a good sized section of the review each month until complete. The present article is introductory and deals with the statistics of the industry and the classification of the patents that are to follow in the next issue. We believe that our readers will want the entire series. We shall hold the matter in type and if there is a sufficient demand, we will reprint the entire series bound in a single cover.

Pyroxylin as an Imitative Material

Rarely has a single man-made substance been found so versatile as the plastics based on cellulose nitrate. From motion picture film to artificial coral seems a long step--but pyroxylin is suitable for both

By Joseph Rossman

This is a further portion of the interesting compilation prepared by the author. As the series of articles is a complete review of the United States patent art on this subject, it will save many weary hours of searching for those who are delving into this subject and must know what has been done before in this field. We know of no similarly complete compilation.

CONTINUING with the discussion as to carrying the process into effect, a sheet of celluloid, zylonite, pyroxylin, or other somewhat analogous plastic material or strata of spots and colors and lines, as brown, gray, light smoke, ivory-white, olive, green, dark smoke, transparent, semi-transparent, or other colors adapted to produce the required color or spottled effects as existing in natural horn, is cut up by means of a die or other suitable appliance into a triangular or somewhat similar shaped sheet adapted to be formed while slightly heated around or over a suitable core into hollow cones adapted to be combined so as to form a solid rod, bods, or other required figure. These lined and colored or laminated cones are then nested together and secured in place by means of cellulose or other suitable cementing substance in any preferred manner, so as to constitute a solid, laminated body closely resembling natural horn both in structure and in color effect.

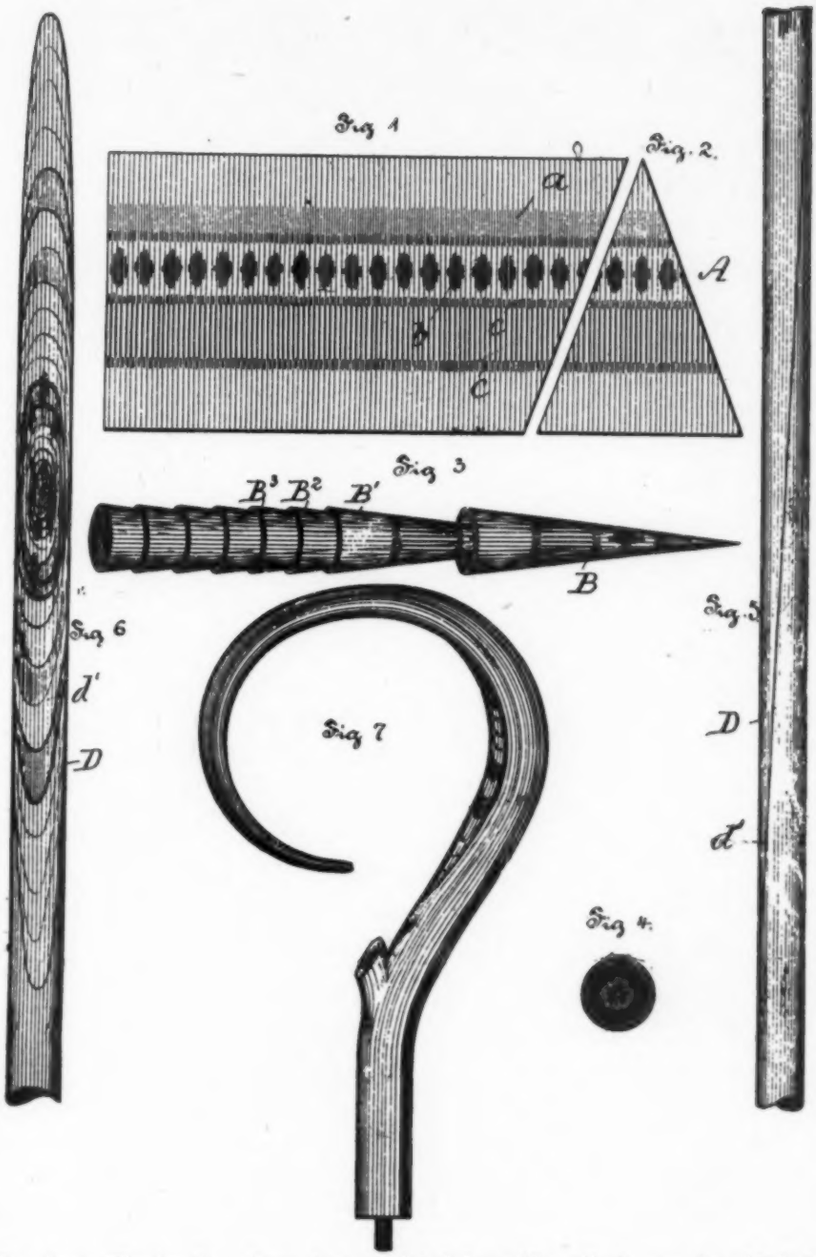
Striated Effects

A description of the process is given with reference to Figs. 1, 2, 3, and 4. A sheet of celluloid, zylonite, pyroxylin, of other somewhat analogous material or materials having layers or strata of lines a, spots b, and bands c, of suitable colors for producing the color effect of natural horn—for example, brown spots or lines, light smoke, ivory-white, dark-green, gray, transparent or semi-transparent lines, is cut up by means of dies into triangular sheets A and then bent around or over a core or other suitable appliance into a hollow and conical-formed figure B. It may be remarked that each of the sheets A may be of any required size or dimension, and any preferred number of the hollow conical-shaped figures may be nested and united with one another. In the present instance eight of the hollow conical-shaped figures B, B^1, and B^2 are nested together or laminated and attached or secured together by means of an adhesive substance or cement, so as to form a solid integral conical figure. At the respective outer points of union of the series of cones B, B^1, and B^2 with one another the projecting edges by a gentle rolling operation are turned off in such manner as to form one solid integral rod or bar, such as shown in Figs. 5 and 6. In this operation care should be exercises not in any way to destroy the color, line, or spotted parts or portions of the united conical figure or body in imitation of the grain or nerve tissues of the natural horn. Furthermore, in the union of the respective conical-shaped figures with one another care must be exercised to place the spots b of one conical-shaped figure in proper alignment with the corresponding spots on the other conical-shaped figure in order that in the finished article the spots will appear disposed around about the center and extend therefrom in the tip or integral portion of the structure, whereby a most desirable variety of radiating colors and lines in imitation of the grain or nerve tissues of natural horn will exist therein.

Umbrella Handles

The following is a description of the method of making an artificial horn-hooked handle for an umbrella-stick, and in this connection reference is made to Figs. 5, 6, and 7, in which D is a rod or bar cut obliquely at d^1, as shown in Fig. 5. This bar is made up of a series of conical-shaped figures B B^1 B^2, etc., formed from sheets of celluloid or pyroxylin, having layers or strata colored with fine lines, spots, and bands of dark brown, dark green, light or dark smoke, olive, green, gray, ivory-white, transparent or semi-transparent, or other preferred colors adapted to produce the color effect of natural horn in the finished article or to expose to view

Continued from page 153 of the March issue



The above illustration shows how striated horn-like effects can be obtained with pyroxylin.

in the oblique portions of the rods the characteristic marbled, watered, or clouded effect corresponding with the grain or nerve tissues existing in natural horn. The rod or bar D, being cut obliquely, as shown in Fig. 5 or 6, is then bent in any preferred manner, so as to assume the hooked form shown in Fig. 7, when the bar or rod thus treated is polished in any preferred manner for use. It may, however, be remarked that the polishing operation may be resorted to before the bar or rod D is caused to assume its curved or hooked form.

A Recent Artificial Horn Process

In a recent patent 1,593,314, July 20, 1926, for making artificial horn, a pressed block of pyroxylin plastic, colored and slightly clouded to represent the transparent part first is first made. After smoothing off the top of the block there is printed by means of stencil or type or patterned roller, and preferably with a solvent ink, such part of the design in streaks or blotches as will represent the appearance of natural horn when of an equivalent thickness or gauge. This thickness will vary say from 5 to 25 thousandths of an inch according to the thickness of the final sheet or article. By suitable manipulation or shifting of the printing effect it is possible to create the necessary variety of pattern in these successive planings, so that the bulit-up sheets finally produced will represent the pattern or mixture of components in a piece of natural horn.

The principle involved in the invention is the building up of a mass of imitative substance by means of sucessive layers which represent the fractional parts of the natural substance imitated.

In the accompanying drawing, which illustrates the invention and is shown on page 202 Figs. 1 to 4 inclusive represent successive planings upon each of which has been printed or otherwise impressed a design in imitation of the natural design appearing on successive sections of tortoise shell, and Fig. 5 shows the product formed by consolidating the sheets of Figs. 1 to 4 and wherein the different designs of sheets 1-4 are all visible in the consolidated sheet.

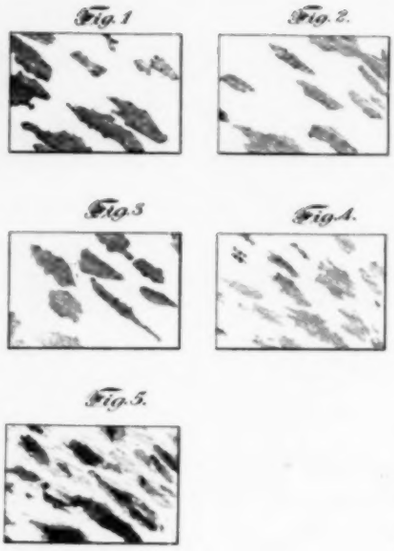
The final decorated product is formed by the consolidation of four decorated sheets. These sheets might be 1/32" in thickness and the final cut sheet four times that thickness. For a shell of forty-one thousandths inch the individual sections could be approximately ten thousandths inch. For half an inch they might be one hundred thousandths inch, or for a close pattern full of detail six eight or even ten sheets might make up the final product. In the production of imitation tortoise shell, the component sheets would be transparent amber, and the printings would be dark brown, the detail of which would be the peculiar fine broken lines of the real tortoise shell.

Horn-Like Material From Raw Skins

A material resembling transparent horn or whalebone is made by a process described in patent 749,297 Jan. 12, 1904 which consists in filling raw skins with gluey substances, as

for instance, gelatin, glue, isinglass, and the like, and with nitrocellulose after which the skins, as well as the substances with which it is filled are made insoluble.

The process is carried into effect in the following manner: The cleaned and depilated skins are treated with lime for opening the pores and are then brought in a solution of gelatin, glue, isinglass, and the like. This solution, which may contain, for instance, five percent of the gluey substances, must be very thin, which may be attained by heating it or adding a few drops of acetic acid. After the skins have remained one or two days in this solution they are brought into a solution of collodion prepared with glacial acetic acid in order to bring nitrocellulose into the skins. In consequence of the collodion being dissolved in glacial acetic acid the nitrocellulose can penetrate into the fibers. By the skins being brought into these solutions they swell and take up a relatively great quantity of these solutions. Thereafter the skins are dried and afterward brought in a solution by means of which the skins, as well as the substances contained in it, are made insoluble, as for instance, a diluted solution of chlorid of aluminium. This solution may contain from one-half to two percent of chlorid of aluminium. It will be understood that any other convenient tanning material may be used for this purpose. In this solution the skins remain six hours. Thereafter they are taken out and dried or pressed. The skins then form a more or less transparent horn or whalebone like material of great elasticity and tenacity.



Illustrating the method of making artificial horn in accordance with U. S. Patent 1,593,314, described on p. 201.

TABLE II.
CLASSIFICATION OF ARTIFICIAL RESINS

I. Phenol aldehyde condensation products.
  1. General, miscellaneous, apparatus.
  2. Preparation.
    a. With acid catalysts or condensing agents.
    b. With alkaline catalysts or condensing agents.
    c. With neutral catalysts or condensing agents.
    d. Without catalysts or condensing agents.
  3. Purification.
  4. Hardening.
  5. Utilization.

II. Resins derived from hydrocarbons.
  a. Cumarone resins.
  b. Resins from vinyl compounds.
  c. Other resins falling in this general group.

III. Resins from hydrocarbons and aldehydes.

IV. Resins from halogen compounds (chlorine compounds) by splitting off hydrochloric acid.

V. Resins from naphthalene and benzyl chloride.

VI. Resins from Naphthalene and Oxalic acid, etc.

VII. Resins containing sulfur.
  a. from aromatic hydrocarbons.
  b. from aromatic amines.

VIII. Resins from ketones, ketone-alcohols, etc.

IX. Resins from ketones and aldehydes.

X. Resins from amines and aldehydes.
  a. from actaldehyde.
  b. from acrolein.
  c. from furfural.

XI. Resins from amines and aldehydes.

XII. Resins from urea and formaldehyde.
  1. Preparation.
  2. Hardening.
  3. Utilization.

XIII. Resins from Phenols.

XIV. Phenol-sulfur resins.

XV. Resins from fulfonic acid amides and formaldehyde.

XVI. Resins and the Glyptal types.
  a. Preparation.
  b. Utilization.

XVII. Improving properties of natural resins.
  a. by esterification.
  b. by other methods.

XVIII. Improving properties of artificial resins.

XIX. Miscellaneous Resins.

XX. Miscellaneous allied processes and uses.

Progress in Resins

(*Continued from page 199*)

used for carrying out commercial crystallization of salts and the like. Its electrical insulating property is such that it may be used for the construction of apparatus for carrying out electryolysis of the heavy-metal salts. It is unaffected by hydrofluoric acid, hydrochloric acid, phosphoric acid, dilute sulfuric acid and practically all of the organic acids. It is resistant to chlorine, but is affected by iodine and bromine. It is not resistant to alkalies, however, nor to organic bases and such oxidizing acids as nitric acid, chromic acid and against hot concentrated surfuric acid.

As a striking example of what can be accomplished with the *Haveag* resin products, it may be mentioned that a single tank of the material, holding no less than 15 cubic meters has been made. By producing the tanks, etc., at the place where they are to be employed, even larger objects can be constructed. The joining together of apparatus by the use of a special cement call-

(*Continued on page 212*)

Tentative Revisions of Standard Methods of Testing Molded Insulating Materials

As formulated by Committee D-9 of the American Society for Testing Materials

THE changes indicated below are to be made in tentative standards D-48-27, and apply the methods originally issued in 1917, adopted in 1922 in amended forms, and revised in 1924 and 1927. Further revisions may be expected in the future.

For 1929 the following changes will be in effect.

Section 2.—Change from its present form: namely,

2. Any standard testing machine may be used provided the error in the loading range does not exceed 1 per cent. Special clips (see Fig. 1) of hardened steel shall be used, hung from links held in the jaws of the machine, so that the pull is central at all times, to avoid any transverse strain.

to read as follows:

2. Any standard testing machine may be used provided it is accurate to within 1 per cent of the lowest load to be applied. Special specimen holders of steel, as shown by Fig. 1 (*a*), shall be used. The specimen holders shall be attached to the heads of the machine by links so that the pull is central to avoid any transverse strain.

Section 3.—Change from its present form; namely,

3. The standard test specimen shown in Fig. 1 shall be used for the tension tests. It shall be molded to the dimensions shown in Fig. 1.

to read as follows:

3. For hot-molded materials and for plastic cold-molded materials (see Note 1), the test specimen shall be molded to the form and dimensions shown in Fig. 1 (*b*).

Note 1.—Due to wide difference in molding characteristics, the specimen suited to hot-molded and plastic cold-molded materials is unsuited to the nonplastic inorganic cold-molded materials. A specimen suitable for these latter compounds is now under consideration.

Section 4 (*b*).—Omit the last sentence of this section, reading as follows:

Measurements may be taken at intervals during the test to show the elongation of the specimen when required for elastic materials.

Section 5.—Change Paragraph (*b*) to read as follows by the addition of the italicized words:

(*b*) The thickness *and width* of each specimen in inches or millimeters as measured by a micrometer at the center of the specimen, that is, the point of minimum section;

Change Paragraph (*d*) from its present form: namely,

(*d*) The character of the material tested, with description of how it acts under stress;

to read as follows:

(*d*) The character of the material tested, with a description of the fracture and its location with respect to the middle point of the specimen;

Change Paragraph (*e*) to read as follows by the addition of the italicized words and the omission of the word in brackets:

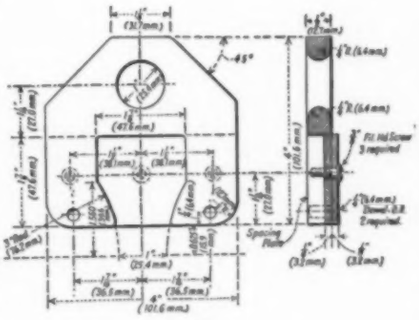
(*e*) The speed in inches or millimeters per minute at which the [jaws] *head of the testing machine* traveled during the test.

Figure 1.—Replace the present figure showing the tension test specimen with a new figure

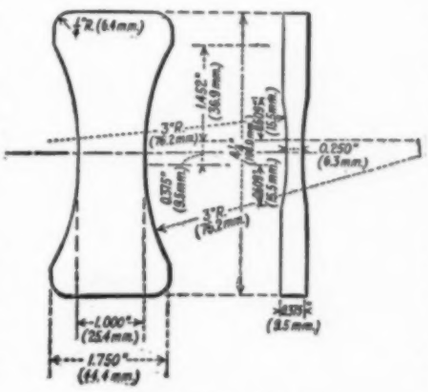
(*Continued on page 206*)

In order to give our readers the complete state of the present standard testing methods employed for examining molded electrical insulation, we publish here the changes proposed some time ago. These refer to the methods described on our pages during 1928 and 1929, Vol. 4. Nos. 11 and 12 and Vol. 5., Nos. 2 and 3.

This completes the series of these articles.



(a) Specimen Holder



(b) Tension Test Specimen
New Figure

Technical Abstract Section

A Concise Review of Patents and Literature

Manufacture of Aminoplastics (Urea-formaldehyde products). Kurt Ripper, assignor to Fritz Pollak, Vienna, Austria. U. S. P. 1,687,312; Oct. 9, 1928.

(1) 30 parts by weight of pure and neutrally reacting urea are mixed with 100 parts by weight of a 30% aqueous solution of formaldehyde which is free from acid or is neutralized or is slightly alkaline, the mixture being heated to boiling in a boiler with a reflux condenser. After short boiling 5 parts by weight of boric acid, dissolved in a little water, are added thereto; the whole mixture is thereafter further boiled in the boiler with the reflux condenser.

The reaction mass is converted after about 2½ hours into the moderately viscous solution of a yet strongly hydrophile emulsion colloid which does not become cloudy when cooling and which may be further treated according to any known process. The material is poured into moulds after most of the water is expelled and is thereafter hardened at a temperature ranging from 60 to 100° C. into a final material as transparent as crystal.

If the period of 2½ hours is exceeded and heating is contained, after 6 to 7 hours such state of the reaction mass is arrived at, that it is clear when hot but turns white on cooling, a slimy gel being separated therefrom. After being allowed to stand in the cold for several hours, the material is found to be divided in two layers. The upper layer is poured off, the tough gel forming the lower layer being repeatedly washed with water. The said gel, colored white owing to absorbed water, is freed from the latter in a vacuum and assumes thereafter the transparency of water; it is now ready to be poured into moulds and hardened.

The operation of extracting the gel by separating the layers as just described may be replaced by the following: The whole of the reaction material in which the colloid has become hydrophobe is evaporated in a vacuum, poured into moulds and hardened after the acid in excess is neutralized and after the free formaldehyde is bound.

Impregnating fibrous material, as paper and fabrics, with gelatine, casein, etc. Alfred Lutz, assignor to Ronald C. Lee, Bedford, N. Y. U. S. P. 1,682,390; Aug. 28, 1928.

To insure deeper penetration for gelatin or casein solutions, sodium hydroxide or lactic acid is added to the solutions. After passing the paper or fabric through the solutions the hardening agent, such as formaldehyde or methylolformamide is sprayed on. When dry the product is both oil as well as water proof.

Sound record composition containing a sulphur resin and white lead. Frank E. Laymon and Linwood T. Richardson, assignors to the Cutler-Hammer Mfg. Co., Milwaukee, Wis. U. S. P. 1,682,913; Sept. 4, 1928.

Sulphur-phenol or naphthalene-sulphur resins are mixed with a lead compound such as white lead to render them innocuous to the polished nickel dies in which phonograph records are molded. About 40 parts of this resin are mixed with 60 parts of filler. Molding is carried on at 300-350° F.

Among the resins of the sulphur type which may be thus employed, may be mentioned as examples those produced from the following or equivalent substances in approximately the proportions stated:

(a) 100 parts of naphthalene, 100 to 150 parts of sulphur monochloride together with a small portion or trace of iron or other suitable catalytic or activating agent, 150 to 200 parts of sulphur.

(b) 100 parts of naphthalene, 150 parts of sulphur monochloride together with a small portion of iron or other activating agent.

(c) 100 parts of a phenol, 200 parts of a chloride of sulphur, 75 parts of sulphur.

(d) 100 parts of a phenol, 210 parts of a chloride of sulphur.

These and numerous other resins of the sulphur type may in accordance with the present teaching be employed advantageously in production of accurate and permanent sound records having commercial value and utility.

Synthesis of Methanol; copper catalyst for. Henry H. Storch, assignor to Roessler & Hasslacher Chemical Co., New York. U. S. P. 1,681,750; Aug. 21,1928.

As a catalyst to promote the formation of methanol (methyl alcohol) from CO & H, copper is produced from a cuprammonium compound. (See article in December 1928 PLASTICS p.).

Soluble resin from diacetone alcohol and formaldehyde. Augustus E. Maze, Orange, N. J.

To 1160 grams of diacetone alcohol are added 0.4 grams of sodium hydroxide dissolved in 10 cc. of water. This mixture is placed in a flask surrounded by a cooling bath and equipped with a reflux condenser. Into this mixture is run slowly 2250 grams of 40% aqueous solution of formaldehyde. The temperature rises rapidly. The mass is then removed from the flask.

A resinous mass separates and the supernatant aqueous layer is removed. The resinous mass is heated to expel the water and fuse the mass.

Abrasive paper made with synthetic resins. Carl A. Klein and Robert S. Brown, London, England. U. S. P. 1,687,453 and 1,687,454; Oct. 9, 1928.

(a) A waterproof sheet abrasive material comprising a base, a waterproofing composition applied to such base as a preliminary treatment and consisting of linseed oil with a small proportion of a suitable wax, an adhesive composition subsequently applied and consisting of a drying oil with a synthetic resin, and an abrasive material.

(b) A process for the manufacture of waterproof sheet abrasive material consisting in waterproofing the base by passing it through a bath of linseed oil containing a small proportion of a suitable wax and kept at a temperature of at least 100° C.; removing any surplus by means of pressure rollers also kept heated to 100° C. or over; applying the adhesive consisting of a mixture of a drying oil with a synthetic resin also at a temperature of over 100° C.; applying the abrasive material to the base thus prepared and baking at a temperature of over 100° C.; and applying a second coating of adhesive and rebaking also at a temperature of over 100° C.

Cold-molding resinous composition: Sulphur-phenol resin. Frank E. Layman, Linwood J. Richardson and Oscar A. Cherry, assignors to the Cutler-Hammer Mfg. Co., Milwaukee, Wis. U. S. P. 1,682,914; Sept. 4, 1928.

5. The process of treating a cold molding phenol-sulphur chloride resin produced from about 100 parts of phenol and 140 parts of a chloride of sulphur and melting at about 140 degrees F., which comprises melting and heating said resin to a temperature of about 175 degrees F., mixing with about 175 parts of the resin about 50 to 75 parts of sulphur monochloride, heating the mixture above the melting temperature to effect substantially complete reaction of the ingredients whereby a resin having a melting temperature of about 195 to 220 degrees F. is provided, mixing with 35 to 45 parts of said resin about 60 parts of a filler material, subjecting the mixture to quick hot molding treatment at a temperature of 275 to 300 degrees F., and allowing the molded articles to harden by cooling.

A fine, almost colorless pulverulent precipitation of purified resin is obtained, which easily deposits and may be easily filtered. After washing and drying the resin is a nearly white pulverulent body, free of by-products.

OUR LABORATORY

but dedicated to your interests

ALIKE AS TWO PEAS—to the naked eye, perhaps. But the microscope detects things about the physical nature of the basic materials used in Celoron, that may mean the saving of thousands of dollars to Celoron users.

WHAT IS GOING TO HAPPEN? One of the departments of the Celoron Laboratory where theory is subjected to the acid test of actuality—where new resin compounds for the improvement of Celoron Molding Powders are tested out.

Manufacturers and molders, who have adopted Celoron Molding Powders, know the vital service that the Celoron Laboratory is rendering their businesses.

For they realize that years of study, research and experiment must have been necessary for the development of such an improved plastic material, so well adapted to their requirements.

They know that the uniform high quality of Celoron Products could only be maintained through the most exacting laboratory control of every phase of the great Celoron Plant's production.

They welcome the untiring pioneering spirit with which Celoron scientists, engineers and chemists labor on to produce still greater improvements for the future. To produce new products, new methods, new standards of quality. To offer these advantages to Celoron customers—first.

THE CELORON COMPANY
Bridgeport . . . Pennsylvania
In Canada: 350 Eastern Ave., Toronto

CELORON PRODUCTS

Celoron Molding Powders; Synthetic Resins, Varnishes and Cements; Laminated Celoron sheets, rods and tubes for radio, electrical and industrial purposes; Celoron Silent Gears.

DIVISION
CONTINENTAL-DIAMOND
FIBRE CO.

CELORON
MOLDING PRODUCTS

Revisions in Testing Methods

(*Continued on page 203*)

conforming to the accompanying Figs. 1 (*a*) and (*b*).

Section 15.—Change from its present form: namely,

15. The test specimen shall be molded to the dimensions shown in Fig. 4. The mold shall be hardened and ground to these dimensions. If the material cannot be molded to the full height shown, the height may be reduced to 1¼ in. (31.8 mm.).

For materials having a puncture value higher than 300 volts per mil, the thickness of the bottom of the specimen may be reduced to 0.098 in. (2.5 mm.). It should be noted, however, that the apparent dielectric strength in volts per mil may be increased as much as 50 per cent when the thickness of the bottom of the specimen is so reduced.

to read as follows:

15. The test specimen shall be molded in the form of a disk 4 in. (10.16 cm.) in diameter which should be ⅛ in. (3.18 mm.) in thickness for hot-molded materials and ¼ in. (6.35 mm.) in thickness for cold-molded materials."

Report

Section 16.—Change paragraph (*a*) from its present form: namely,

(*a*) Voltage shall be applied to the test specimen by floating the specimen on mercury and placing a pool of mercury about ⅛ in. (3 mm.) deep inside the specimen.

It is recommended that all tests be made in air, but whenever it is impossible to puncture the specimen in air without arcing over the edge, it shall be immersed in high grade transformer oil. On specimens which require a very high voltage to puncture, it may be necessary to put a glass tube or shield over the wire leading to the mercury on the inside of the specimen in order to prevent breakdown over the surface of the oil between terminals. The testing voltage shall be raised at a con-

stant rate of approximately one thousand volts per second until puncture occurs.
to read as follows:

(*a*) Voltage shall be applied to the test specimen by means of two flat electrodes 1 in. in diameter with edges rounded to a radius of 1/8 in. These electrodes shall be placed directly opposite each other at the center of the specimen.

It is recommended that all tests on hot-molded materials be made under oil and tests on cold-molded materials in air. Testing voltage shall be raised at a constant rate of approximately 1000 volts per second until a puncture occurs.

Omit Paragraph (*c*) reading as follows:

(*c*) The results from specimens where puncture takes place up on the side of the specimen instead of through the bottom shall be discarded. Experience shows that very plastic materials which flow easily in the mold always puncture through the bottom, while materials which do not mold readily will often puncture through the side walls of the specimen at some distance up from the bottom.

Section 17 (*a*).—Change from its present form: namely,

(*a*) The thickness of the bottom of each specimen measured with a micrometer in the direction perpendicular to the bottom surface, and also the thickness at the point of puncture, regardless of the path taken by the discharge. The thickness of each specimen shall be given in mils or in millimeters.
to read as follows:

(*a*) The thickness of each specimen shall be given in mils or millimeters.

Figure 4.—Omit this figure.

Criticisms of this revision are solicited and should be directed to Mr. T. S. Taylor, Secretary of Committee D-9 on Electrical Insulating Materials, Bakelite Corporation, 230 Grove St., Bloomfield, N. J.

Shock-Absorbing Plastics

(*Continued from page 194*)

of the hardening process depends upon the form and volume of the articles under teatment.

If, instead of being merely molded, the articles are to be

machined or subjected to tool manipulation, it is desirable to interrupt the hardening process at a stage at which a sample article cooled down to ordinary room temperature is sufficiently hard to be bored, drilled, planed or otherwise tool manipulated without deformation; then to carry out the desired manipulation and finally to replace the machined articles in the drying chamber to complete the hardening process.

The machining of the articles before completion of the hardening process has very decided advantages, inasmuch as at this intermediate stage the articles are still substantially elastic and offer comparatively little mechanical resistance to the tools, so that the effectiveness of the latter can be exerted to the full.

The hardening process should not be continued beyond the stage at which a sample, dipped in fuming alcohol for say one minute, no longer shows any tendency to dissolve. To continue the hardening process beyond this stage is detrimental as the chemical composition of the product will be adversely affected.

The material is entirely free of internal tension because, by reason of the absence of pressure in the method, the volatile constituents which are present in other materials of this general character are absent from material made by the process described.

Articles of practically any size and weight may be produced, particularly if in molding or forming the articles the expedients generally employed in the manufacture of porcelain are used.

Laws of Plastification

(*Continued from page 198*)

hereinabove) it will suffice to say that the effect is produced when pouring a fairly viscous mass into a mold and allowing it to harden therein. Even the effects of stirring can be accounted for. The conditions obtaining in the case of a urea-formaldehyde condensation prod-

uct such as *Pollopas,* which is shaped in permeable molds so that there is but little tendency to flow shows that plates thus formed have a higher modulus of elasticity (hence are less elastic) than plates made of a synthetic resin of the phenoplastic type such as *Bakelite.*

The behavior of many of the inorganic plastic masses, such as clays and kaolin, is discussed, but this is beyond the scope of our magazine and belongs in the realm of ceramics. However, even here the laws of plastification were found to be valid and influential in determining the final properties of the products. Other inorganic plastics, and especially glass, show a similar effect.

Metals are not ordinarily classed among the plastics, but they are really plastics in the true sense in that they may be displaced and shaped in the cold. The manufacture of cold-headed bolts and screws, for example, and drawing of copper, platinum and other malleable metals, is a true plastic phenomenon. A particularly apt example is the behavior of wire when undergoing the drawing operation. A large number of examples from the metal-drawing industry are given to show that the same fundamental laws of orientation apply to the metals as well as the plastics as ordinarily known.

Principles and Methods of Applying Them

Taking all the above into consideration, a number of basic principles are worked out, and it is shown that quite a few of the patented methods are quite at variance with the results they seek to attain, and show that the methods proposed are not suitable to attain the desired end. Most of the plastic materials are di-phasic in nature, that is to say they usually consist of some discrete (separate) particles that are imbedded in a continuous phase or imbedding material, and it is the position of these descrete particles that determines the character of the finished plastic. The tendency is either toward the formation of elongated chains (fibers) or

the production of thin films (due to the lamellar nature of the individual plastic particles).

It will therefore not be difficult to understand how it is that overmuch working, and especially kneading, can act destructively to the desired elastic and plastic properties of a given material. The best kind of orientation is attained during the extrusion method. Despite this, many patents (and we shall mention but a few of them for purposes of proving our point—namely German Patent 241887; 368942; British Patent 107769; Austrian Patent 64651) actually aim to increase the plastic properties of the material they are working with by macerating the same in kneading mills and the like. Too much of this kind of working will tend to break down the orientation of the particles and will do more harm than good. The only time when kneading or working of this kind is of any real value is during that phase of the process where the dissaggregation of the particles, (i. e. their being rendered smaller,) is being effected. Once the limit of subdivision has been reached, further grinding or kneading is harmful.

The ideal effect is to comminute to just the desired degree, followed by a treatment which will cause a definite patterned orientation of the particles so that the desired elasticity is imparted to the product. This orientation may be effected by: pouring (orientation) rolling (producing a packing-action on the particles) or by extrusion (which produces both orientation as well as packing.)

Light Sensitive Plastics

(*Continued from page 191*)

the second stage of the process, one may add 20 cubic centimeters of a 40 per cent. solution of formaldehyde.

The color may be varied by introducing suitable coloring materials during the second step of the process. For instance, one may introduce auramin, to produce a deep amber color; methyl violet, to produce amethyst, acetyl red, to produce 'dregs of wine', etc. The coloring material should be added in small quantity, usually not exceeding 1/2 of 1 per cent. of the mass. Oils or waxes may be introduced in small quantity, if desired, to produce opaque material. Ground mica or fish scales may be used to produce a shimmering effect."

"The concentration may be performed in vacuo, if desired; and the hardening operation may be performed at atmospheric pressure, or at higher pressure, or at reduced pressure, or in vacuo."

This article will be continued in our May issue.

Progress in Resins

(*Continued from page 202*)

ed "*Havegit*" pipes, launders, etc., can be integrally connected with the *Haveag* tanks or vats, thus enabling the construction of acid-resistant units for chemical processes. Armored tanks, having metallic inserts as reinforcement, have also been made. The new material opens up an entirely new outlet for the resinoid industries, and as the tanks, pipes, etc., made from the *Haveag* may be repaired, and altered, their rapid introduction into chemical and allied industries is foreseen. So much then for the latest and most novel uses of the phenol resinoids.

Aminoplastics

The urea-formaldyde products appear to be next in line of interest, and much has been accomplished with them in the past few years. Not only has the Vienna inventor Dr. Pollak been very active, but many of the large chemical firms have entered the field. Foremost among these firms, for the number of patents granted, is the large German Dye Trust known as the Interessengemeinschaft Farbenindustrie, which is a combine of all the large German Dye and Chemical Works.

The so-called "*Glyptal*" resins, which are made from phthalic anhydride and glycerol, first appeared in relatively large amounts on the American market during the year 1927. The product has many very unique qualities and its extensive employment is inevitable.

Many of the patents concern themselves with special processes for the more rapid and complete hardening of the resinoids, that is to say their conversion from the fusible-soluble to the infusible-insoluble or "C" stage. Other inventors have labored on improvements in refining natural resins, in endowing ordinarily cheap and relatively useless natural products with new and valuable

properties; whilst still others directed their attention to the production of purer synthetic products. The rate of production of the resinoids, throughout the world, is steadily on the increase. As an example of this the following figures, for the United States alone, are given:

Table II.
UNITED STATES PRODUCTION OF ARTIFICIAL RESINS.

Year	No. of Producers	Production 1000 (lbs.) units	Sales 1000 (lbs.) units	Value in units of $1000.00
1921	3	1644	1874	1352
1922	5	5944	6416	4315
1927	7	13452	13048	6095

Present European production is stated to be on the order of 4,000 metric tons. There is also every indication that the cost of phenolic resinoids, in America, will be lowered by reason of the fact that most of the essential raw materials, such as phenol, formaldehyde and glycerol have become cheaper and more available. This will probably lead to the replacement of many articles at present made of wood by the synthetic resins of this general type.

I have taken the available patented material, which comprises almost 500 patents and have arranged it in 20 general groups, with certain sub-groups. This arrangement, which will be carried out throughout the entire series of articles, is based both on processes of manufacture as well as on composition of the products.

Classification

On page 202 I have classified the patents in this broad field, constituting a continuation of my work already published in KUNSTSTOFFE during the years 1926 to 1928. Each of the patents has been given a serial number (which appears in the first column in ( )). In each of the above groups the patents are arranged by countries, those of the United States coming first, followed by the other countries in alphabetic order, and numerical order thereunder. Wherever possible the corresponding "Friedlander" index number has been given (this refers to the large German compilation of patents on organic chemistry). The serial number makes it easy to look up the patents and makes cross-references for corresponding patents in various countries simple. An index to the present series of articles will be the concluding installment.

The articles giving the patents will begin in the May issue, with Group I, Phenol-aldehyde resinoids.

BOOK REVIEWS

Glycerol and the Glycols. By James W. Lawrie. The Chemical Catalog Co. Inc., New York, 1928. 447 Pages. Price $9.50.

THE present work is an authoritative resume of all the technological and scientific data published on the important subjects of glycerol and the glycols. As such it is certainly worthy of publication.

The preponderant bulk of the work deals with glycerol, a product of unquestioned economic value and importance, from its discovery by Scheele through to the modern fermentation methods of production. The first four chapters deal with the various saponification methods of production, evaporation of soap lyes and processes for the recovery of glycerol. Chapter 5 brings together the widely scattered literature on fermentation processes for making glycerol, which was first energetically pursued in Germany during the war. Following a theoretical discussion are descriptions of fermentation processes which were taken largely from patents granted on the subject. The balance of the book, with the exception of the chapter on glycols, is concerned with the physical properties and constants. Chemistry and reactions, tests for detection, quantitative estimation standard specifications, commercial utilization and a word about the future—all about glycerol. There is also a chapter on the manufacture of nitroglycerol.

With the recent advent of the glycols into a position of consequence in the lacquer and solvent fields, the treatment of this subject is very timely and one that deserved a greater proportion of space than the author spared for it. In this last chapter, he goes into the various methods for producing ethylene glycol, the glycol ethers, polyglycols and their derivatives, as well as enumerating their properties. Compatabilities with other solvents, as well as the cellulose esters, are enumerated. It is well written and should find use in industrial research laboratories.

Handbook of Chemistry and Physics. Chemical Rubber Publishing Co., Cleveland, Ohio. Edited by C. D. Hodgman and Norbert A. Lange. 1214 pp. 13 ed. Price $5.00.

Continuing their policy of keeping this book up-to-date, the editors of this very useful handbook have recently brought out the thirteenth edition. They have included, as before, and enlarged upon the numerous chemical, mathematical and physical tables that were included in earlier editions. In this latest book, they have completely revised the section dealing with the specific gravity of aqueous solutions. A new form of table has been adopted giving, in addition to the specific gravity and Baume-hydrometer reading, the mass of substance in

(*Continued on page 234*)

MOLDED PRODUCTS

Devoted to the purchase, further use and merchandising of all manner of molded parts

Vol. 3 **APRIL, 1929** **No. 4**

Catalin Enters Cosmetic Container Field

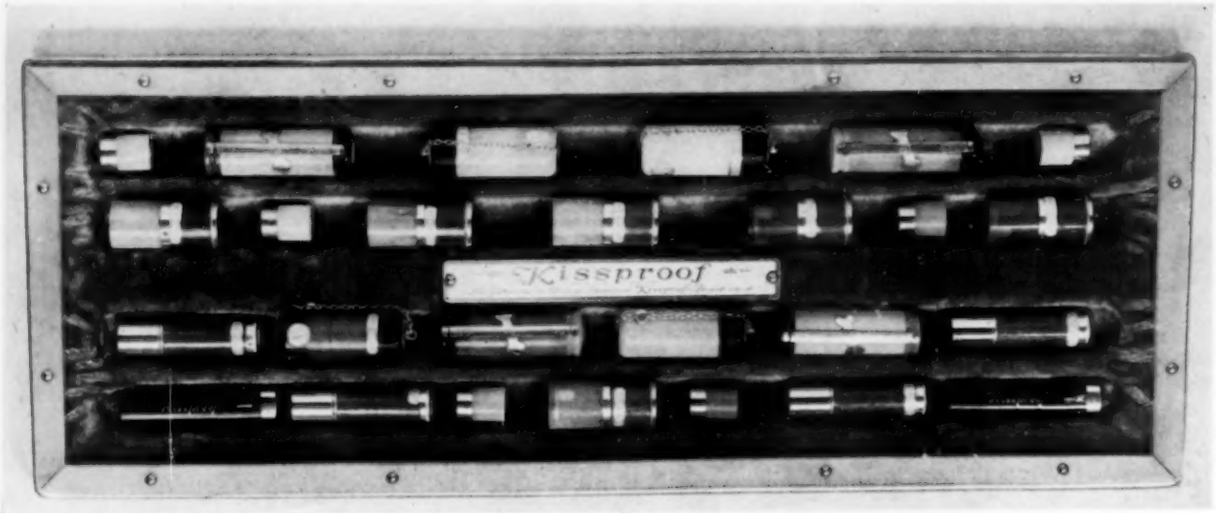
Kissproof has exclusive right to use this very effective material for lipstick holders, perfume vials and cold cream jars

CATALIN has found a place for itself in the sun that shines upon the plastic world. This material, which has been known to the industry for some time in its wide range of variegated color solids, is being featured in a nation-wide campaign presenting the Kissproof brand of cosmetics which are exclusively licensed to use Catalin for their containers.

Lipstick tubes, Perfume vials, and a jarette of a new solid perfume have been devised by Kissproof out of this exquisite material which simulates semi-precious stones, to further adorn Madame when she pauses to adorn herself. These Catalin containers are lovely in their foam flecked greens of sparkling seas, the coral pinks shining through blue water, the azure of Venetian skies, the rosy hues of sunset over water:—these and a myriad other translucent tints glow enchantingly from its polished surfaces.

In presenting the new containers to their dealers, Kissproof Inc., has combined twenty-four assorted lipsticks, in several styles of containers, and twenty-four Catalin perfume jarettes in a lipstick display case trimmed with Catalin, packed with suitable counter and window display cards pointing out the virtues of both the cosmetics and their containers. The Catalin containers are of five types: The Night and Day lipstick tube has a black plunger at one end and a white mottled at the other, each holding lipsticks of contrasting shades (kept in place with a metallic device on the outside of the tube). Kissproof Automatic has a chain attached to the cap which, when removed, releases the lipstick. To return the lipstick to the holder, the chain is pulled and the cap replaced, thus obviating the necessity of touching the lipstick with the fingers. The Kissproof Jumbo is a large size lipstick, the case and cover of translucent Catalin. Kissproof Solid Perfume is packed in a Catalin jarette in the various color combinations and fitted with a nickeled cap. Samples of the regular perfume are offered in Catalin vials with a threaded black plastic stopper which fits into the body of the vial.

Vanity, Clothes Brush and Cold Cream Jar of Cast Catalin.



Kissproof Display Tray, Trimmed with Catalin, showing Lipsticks in new Catalin Tubes.

Not only is Kissproof using Catalin in the smaller sizes of machined stock, but is also planning to use this plastic in larger cast forms. The jar illustrated here is to be used as a cold cream container. The body and cover are made of foam-flecked green, the cover being drilled and tapped to receive the threaded black knob.

Catalin has been used to good advantage in making numerous other articles before the advent of the new Kissproof containers. These have been either cast, or machined from solid Catalin stock. Catalin is produced in color effects which cannot readily be duplicated in the phenolic type of moldable resins. The depth of color in its clear jade, the warmth of its rose quartz, the mystery of lights beneath the surface of onyx and ivory seem to belie the old proverb that "beauty is only skin deep."

The vanity and clothes brush, into which the bristles are very firmly stapled, have an unusually odd red and yellow mottling on a cream colored translucent base. The clock case is a beautifully veined ivory for which none but a prehistorically monstrous mastodon could have provided tusk. De-Luxe shaving brushes are fitted with Catalin handles and the gear shift levers of America's expensive motor cars have Catalin knobs. Catalin finds many fields of application. It is truly a plastic of beauty.

Catalin is available to users in two forms. The more common of these is the usual sheet and rod that is supplied in most plastics that are sold in solid form. Sheets are furnished in thicknesses from 1/8 to 1 inch in all sizes up to 12 by 24 inches. Rods are furnished in any diameter over one-half inch. They are made up in solid colors and also the full range of characteristic Catalin translucent and transparent mottlings.

Catalin may also be cast at the plant of the American Catalin Corp. into finished articles which do not require any additional machining. These castings also may be produced in the same colors and color combinations as the solid stock.

Cast Ivory Catalin Clock Case.

Aladdinite Molding Casein Buttons

THE Aladdinite Company of Orange, New Jersey, which has been developing the molding of casein for some time past, is at present operating on a commercial scale. Two of the large Eastern button concerns are using the entire output of molded casein buttons, and definite progress has been made with other articles, such as pipestems and the like.

Mr. Christensen, the President of the Aladdinite Corporation, was interviewed by PLASTICS, and stated that the button companies furnish him with cloth samples which he matches in the beautiful colors obtainable in casein, and that the buttons are then molded and sent to the companies for finishing. Several Watson-Stillman presses were seen in actual operation, and while production is still limited to the extent of about 50,000 a day, yet the output seems highly satisfactory. Mr. Christensen realizes the present limitations of accurate casein molding. In this way both he and his customers will be more satisfied with the output and with any progress in the future.

Aladdinite, by the way, is to celebrate the tenth anniversary of its founding in June of this year.

Molded Parts Are Important In the Poole Electric Clock

Molded Parts in Both Mechanism and Case

What is more vexing than a clock that must be constantly wound and regulated—a clock that calls for a conference and a comparison before approximately correct time can be told. Most clocks have this failing. But the new Poole Electric Clock is one to spare one such irritation. Without any attention for a full year its clear face will tell the time correctly and irrefutably.

Unique is the Poole Electric Clock as a device for giving the correct time, but it is radically different too in appearance. Its entirely modern conception and design is a far cry from the stereotyped Gothic type clock case and once more points to moldable compositions as the most widely adaptable medium for the expression of modern themes in decoration. With the exception of those parts in the

The molded base and standard of mottled Durez.

mechanism which must of necessity be metallic, the Poole Electric Clock is composed of molded units. The molded parts in this clock combine beauty of surface and appearance, the combination of an intricate and pleasing design requiring operations in its execution that are less involved and less costly than if the same parts were machined or fabricated out of wood

The beautiul Poole Electric Clock completely assembled.

or metal and a decorative surface applied afterward. The exposed parts of the clock were molded out of a mahogany effect Durez and the concealed parts of black Durez, product of General Plastics Inc., by Allen and Hills, Inc., of Auburn, N. Y.

Poole Electric Clock, the never necessary to wind electric clock, recently put on the market by the Morse Chain Company of Ithaca, New York, is an attractive, accurate time piece, standing ten and one-half inches in height and suitable for office or household use.

The clock is constructed so that the usual heavy mainspring is eliminated, the weight dropping periodically maintains a pendulum in motion. This weight is controlled and again raised by a flash light battery. The battery will last a year and is hidden within a molded Durez case.

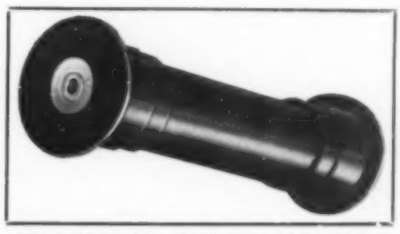
The motivating impulse is

Durez Molded Parts Help Make a Beautiful Assembly

constant. Therefore, the maximum and minimum arcs of the pendulum is also constant and the clock is always right, never needing winding and but an annual replacement of the battery. It avoids the difficulty experienced with some electrically controlled clocks in that the central stations do not always have the master clock, in that it is not necessary for electrical connections.

The base is a beautiful, handrubbed, mahogany effect of molded Durez, seven inches in diameter.

In addition to the clock illustrated, three other attractive models are made: the Salem, Windsor, and Patrician. They are mounted in attractive wooden cases, but the supporting parts are molded of Durez to assure the greatest accuracy of the delicate mechanism.



The battery shell of black molded Durez.

Molded parts, such as are used in the Poole Electric Clock serve more and more to replace wood and metal pieces in both decorative and utilitarian objects. For mass production, where speed, uniform duplication and highly finished surface are required, molding synthetic compositions is far more economical than stamping metal or manufacturing and finishing wood parts.

New Molding Materials and Methods Are Adopted Abroad

Fabric filled Bakelite is introduced in England. Synthetic shellac project under way. New preforming press evolved.

By A. C. Blackall
British Correspondent

QUITE recently an entirely new molding material was introduced in the United Kingdom by Bakelite, Ltd., of London. In this material small flakes of fabric are used as filler in place of wood flour and asbestos. These flaked fabric molding materials possess greater shock resistance than those made from synthetic resins with which wood flour is used as a filler. The volume before molding is 8: 1, as compared with standard wood-flour materials of 3 : 1, and this factor needs to be considered in mold design.

It is claimed for the material that in virtue of its shock-resisting properties it is particularly suitable for the production of moldings for fishing reels, hand-saw handles, switch handles, containers for very heavy materials, and loom parts. The natural color is mottled brown, though other colors can be supplied. In unmolded form the material is in rough flakes, flows freely, and the time required for molding is practically the same as for other bakelite molding materials. In most cases a greater pressure than that recommended for the ordinary molding materials is necessary. The specific gravity of the material is 1.37, and the water absorption 1.275 per cent after 100 hours' immersion.

Synthetic Shellac Enterprise

THE Vocalion Gramophone Co., Ltd., of London, has taken a substantial stockholding in Brownlac, Ltd., an undertaking which has just been formed for the purpose of manufacturing synthetic shellac. This new product can be used for all purposes for which shellac has hitherto been employed, and tests made at the Vocalion factory have shown results equal, if not superior, to those obtained when natural shellac is used.

An arrangement has been entered into whereby the supply of the new material for the purposes of phonograph record making will be confined to the Vocalion Co. and Vocalion (Foreign), Ltd. The capital of Brownlac, Ltd. is £100,000 (500,000) in 400,000 ordinary shares of 5s. (1.25) each, and application will shortly be made for permission to deal in the shares on the London Stock Exchange.

European Molders Adopt New Process

S C. Dutta, representative of the Maschinenfabrik-Fritz Kilian in Manchester, Eng., states that in the most modern European molding factories bakelite powder is no longer directly fed into the hydraulic presses. Instead, the powder is first passed through Fritz Kilian automatic compressors type doppelpresser, of special construction and equipped with automatic weighing machines, which stamp out preliminary moldings at the rate of 3,000 or more an hour, according to the size. These preliminary moldings are then fed into the hydraulic presses for final compression. This slight alteration in the process is, however, very important, as one automatic compressor removes the necessity of installing 50 to 100 hydraulic presses.

This new process has now been adopted by the majority of leading European bakelite mold-

(*Continued on page 228*)

A NOVEL, but practical compact color sample set is being provided for the customers of General Plastics.

This is in a molded case, about 1¼ inches by 4 inches in size, and molded in a harmonious mottled effect. The case carries twenty-two molded color samples, sufficiently large to give the user, an excellent idea of each color. Each sample also has the advantage of being definitely identified with a number clearly molded in raised type.

The whole set is so compact that it is not inconvenient to drop it into one's coat pocket.

Photo courtesy of the Bakelite Corp.

Two Novel Smokers' Accessories Molded In Bakelite

BAKELITE again comes to the aid of the sorely-smitten smoker who has worn ridges in the edge of his thumb, who has torn his hair in frenzy at having put a non-inflammable solvent into his flint and steel cigarette lighter and who generally cusses roundly when such lighter fails to operate at the sixth or eleventh attempt. This time it is an electrically-operated table lighter which comes to his salvation. And it is bound to work every time so long as the powerfully intrenched electric utility companies continue to function—and they are powerful no matter where they happen to be located—and, of course, so long as you pay your electric light bills.

This friend of the smoker is called Arcalite or "The Electric Devil'.' The distinctive design of the lighter with its Chinese red devil's head excites the attention of the beholder. The diabolical grin on its countenance seems to mock the skeptic who doubts its powers of producing a light at an instants' command. But the coil in its sleek black body never fails and the light flashes on at its horns, which act as a spark gap, no sooner—or later—than one presses its button.

Several Colors Used

The Arcalite is manufactured and designed by the American Instrument Co., of Philadelphia, Pa., the molding being done by the Kuhn and Jacob Machine and Tool Co., of Trenton, N. J., in dies made in their own toolrooms. Beside the black and red combination, the Electric Devil is being made also in all Chinese red, and a red and green combination. The material used is Bakelite.

Elsewhere in this issue is illustrated the new Smokerset Ash Receiver, another convenience which comes to the aid of the harried smoker who is continually being accused of strewing his ashes upon that new Oriental rug. This is not due to any inherent carelessness on the part of cigarette and cigar smokers, but generally responsible to the fact that the common or living-room variety of ash-tray is usually a very shallow or unstable affair, very often filling up or tipping over on hardly any provocation at all.

The smoker in this predicament will welcome the Smokerset Ash Receiver for it will hold the ashes and butts of two or three packages of cigarettes before its capacity is taxed. Then, too, it is a thing of beauty for with its smart, mottled Bakelite base and its transparent, green Bakelite handle, it is acceptable as an adjunct to almost any setting.

Style—Does The Molded Products Industry Keep Pace With It.

Industrial Stylist thinks trade suffers in not keeping abreast of rapidly changing fashions

By William Segal

PICTURE this symbolic scene. The consumer's dollar in the shape of a large, luscious pie. Grouped about, carving knives in hand, are the butcher, the baker, the candlestick maker—and a myriad of other ravenous figures—each determinedly seeking the greatest share of the pie for himself.

Somewhere in this crowd of avid, jostling industries is the molded products maker. Young, yet not younger than other new industries who have proved themselves more versed in the art of slicing off generous shares of the consumer's dollar—he is content, in the main, with the crumbs that fall his way.

Style, new ideas, the potent form of advertising and merchandising, the natural advantages in production—all these are at the shoulder of this comparatively fledgling industry, awaiting his summons to help him towards bigger and juicier helpings.

Yet, too many molders remain content with limited helpings . . . content with supplying the demand in set, restricted fields. And while we cannot lose sight of these as the bread and butter nourishment of the industry, it is to greener fields, for the main of our own following, to which we must turn for beautiful harvesting.

Molders Must Regard Style

In my capacity as merchandising counsel to a diversified group of manufacturers, I have found that style occupies a justly-exalted place in most phases of modern-day merchandising. That the custom molding field is no exception to the influence of Lady Style is obvious to the well-informed observer — to most of us.

The rage for color has made fortunes for molding manufacturers, alert enough to meet the demand. Bridge sweeps the country . . . and your makers of molded ash-trays, card-holders, etc. in bridge shapes, start buying new Packards. Milady demands trimmings of molded pieces on her purses and shoe buckles, and molding presses are kept running nights to meet the demand.

Three years ago I suggested to a manufacturer of tortoise shell eye-glass frames that he look around for a new product with which to play. There had started, at this time, a definite trend away from tortoise shell frames. The style sweep towards rimless and metal-rimmed glassed kept growing, until at the present time the shell frame business is considerably off. Yet, when the tide turns the other way, one or two alert manufacturers will make a fortune.

Instance after instance may be cited where success has been

(*Continued on page 229*)

Pyroxylin Plastic Exports From Japan Increase In 1928

The value of pyroxylin plastic products exported from Japan in 1928 show a slight increase over that of 1927 according to the report sent directly to Plastics and Molded Products by Mr. R. Sekido, Editor of "The Celluloid Jiho", a Japanese monthly devoted to the interests of the industry. The following tabulation, in thousands of yen, indicates the value of Japanese pyroxylin plastic exports divided into class of articles manufactured

	1928 add,000	1927 add,000
Camphor	5,447	5,637
Imitation Panama Hats	3,001	2,677
Imitation Pearl	3,886	——
Combs	781	711
Pyroxylin Plastics sheets	249	208
Pyroxylin Plastic finished articles	1,015	840
Toothbrushes	3,221	3,374
Toys and Dolls	4,229	4,077

While these figures represent total Japanese exports, there was shipped to the United States in 1928, pyroxylin plastic products having a value of approximately 3,400,000 yen or about one-fourth of Japan's total production.

	yen add,000
Toys and Dolls	1,600
Tooth brushes	1,200
Brush handles	400
Pyroxylin finished articles	400

The par value of the Japanese yen is 49.8 cents.

Production of pyroxylin plastics in Japan is concentrated about two centers, Osaka and Tokio, of which the former is somewhat more important. The Osaka area has 373 separate establishments manufacturing pyroxylin products which in 1928 had a value of about 7,000,000 yen while Tokio and its suburbs embraces 347 such factories whose output had a value of about 6,000,000 yen.

The exportation of Japanese pyroxylin Plastic products is controlled by six industrial groups or cartels. These cartels regulate trade in combs, tooth brushes, bangles, toys and dolls, and sheeting. The toy and doll trade is controlled by two cartels, one in Osaka and

(*Continued on page 232*)

Pyroxylin As a Safety Measure

The material that has caused great damage by virtue of its inflammability, proved a boon in making possible safety glass

By J. L. Hutchings
Evarts G. Loomis Co.

WITH the momentous growth of the automobile for use in pleasure and business, manufacturers are brought face to face with the problem of providing cars equipped with many safety features which heretofore had never been considered necessary. Traffic congestion is today presenting a problem which challenges the keenest minds in the country and the future problem with thousands of cars being added annually, is one of no mean dimensions. A condition which goes hand in hand with increased congestion, is that of accidents. In years gone by when open cars were largely used, an accident often meant nothing more than a new radiator, fender, bumper, etc. accompanied by a good shaking up of the passengers. Today, with the open car practically replaced by closed cars, an accident usually means the breaking of one or more of the windows with the result that passengers are often badly cut by flying glass, even though the impact caused by the accident would not be enough to cause bodily injury to the passengers. Several methods have been employed to make a non-shatterable glass that would offset this hazard in the past, but a practical product that would induce automobile manufacturers to adopt it was not produced until about a year or so ago. One of the largest automobile manufacturers at that time was convinced of the merits of this glass and made it standard equipment in the windshields of all their models. Since then other manufacturers have adopted this glass and are putting it not alone in the windshield, but all around.

Non-shatterable or safety glass, as it is commonly known, is made by cementing a sheet of transparent celluloid between two pieces of glass. When the glass is broken due to impact or shock it is kept from flying or falling apart by the celluloid sheet to which it is firmly cemented. This method is also employed to make bullet-proof glass the difference being in the thickness and quality of the glass between which the celluloid is cemented.

Sandwich Glass an Old Development

This idea of making safety glass is not new, as it was made experimentally some ten or fifteen years ago. The products made at that time, however, was far from satisfactory as several problems were at once presented to the experimentors in the way of blisters, dirty celluloid, off colored celluloid after exposure to light, opening up of the cemented faces, etc. Since then more or less continuous experimenting has overcome these difficulties one by one. The celluloid that now goes into the manufacture of safety glass is very carefully controlled all the way through from the nitration to the sheeted material which is applied to the glass, no acid is left to cause discoloration upon exposure to light. The mixing can be done in specially lined mixers, so that no rust or foreign matter can contaminate the material. The most modern and up-to-date and efficient machinery is used so that extensive loss can be kept down in the manufacture of this material. After being mixed the stock is then filtered and then returned to the mixer where excess solvents are removed. It is then transferred to the rolls, where the texture is produced and the material begins to take shape. After the rolling operation, the material is placed in a baking press where it is formed into a solid cake. This cake is then placed on a sheeter where it is sheeted with utmost precision. The machine is a fully automatic, hydraulic sheeter of the latest design. The cake of celluloid is fastened on the table which is moved automatically back and forth under the crosshead which carrier the knife. The knife is automatically fed the required amount each stroke and is lifted through the return stroke of the table. The speed of the machine is controlled by a valve conveniently placed for the operator. The normal speed of the machine is from 10 to 12 cutting strokes per minute but may be run faster or slower if desired.

After the sheeting operation the sheets are then seasoned after which they are shipped to the safety glass manufacturer. Until recently these sheets were press polished before shipment. This operation would show up dirt and foreign matter before the sheet was cemented between the glass and the dirty sheet could be discarded, thereby, saving the time of the cementing operation and the loss of two pieces of glass.

Unpolished Sheets Used

The great improvement made in the quality and clearness of the celluloid by celluloid manufacturers is evidenced by the fact that unpolished sheets are now being accepted by the glass manufacturers.

Prize Winning Name Selected At Molders' Association Meeting

$250 Awarded to Ottomar Block but "Resoid" was not adopted generic designation for plastic bodies

AT the last meeting of the Molded Insulation Section of the National Electrical Manufacturers Association, held at the Westinghouse offices in East Pittsburgh, March 29th., the prize of $250.00 offered last November for a name to identify "any substance composed wholly or in part of an artificial gum capable of setting into a hard, non-softening body", was awarded to Ottomar Block, of Caldwell, New Jersey, whose winning contribution was "resoid". Before it was definitely announced that Mr. Block had won, it was rumored that some member of the Bakelite Corporation had submitted the name. Even now we have no definite assurance that Mr. Block himself is not connected, in some manner, with the large staff of "the sign of infinity"!

As the prize winning name in the competition, "resoid" was finally unanimous, although several of the other 257 submitted (notably "rez," "symplast" and "synthoid") were considered for some time before the ultimate decision was made.

We are informed that the Molded Insulation Section of NEMA having selected the name 'resoid', will consider matters relating to its general adoption and use at the next meeting". In other words, "resoid" is not yet generic, even though it won. Well and good, and, needless to say, in accordance with what others have been hoping. We suppose "resoid" was as good a name as any. It must have been. But it certainly lacks the qualities that would not only popularize a generic name, but that would serve to indentify every product of the molding industry.

"Resoid" may be fine as far as it goes, but it doesn't come within a mile of going far enough. To the average man or woman, it is vague, extremely uninteresting and unimaginative, and entirely non-descriptive. True, the Molders Association might eliminate these drawbacks through institutional advertising, but this must be done no matter what name is chosen. And why handicap the advertising to begin with? On the other hand, "resoid", to the technical man or to the purchaser with some smattering of technical knowledge, has the opposite effect. It is most certainly and unfortunately indicative of only one type of composition product,—resinoids. It would be very unwise for the molders to adopt a generic name that would, in its application, be limited to the resins; especially when, even now, so many of them are working with pyroxylin, celulose acetate, and casein, —and that by no means gives a hint on developments that may come in the future.

Another Name Feasible

These, we believe, are important objections, and we urge the molders to think much more seriously before taking any action. At that there are other objections, too numerous to discuss here,—involving advertising, connotation, adaptability and even that well worn word, psychology! As far as any suggestions go,—well, *we* submitted a name, and as we sit here and look over the complete list, ours looks as bad as the others. It might be wise to try every possible combination of the words submitted, and then again it might be best to discard the list entirely and think up some more. It might even pay to run another contest with a bigger prize and more publicity, and use a more complete definition than the one given for this contest.

After all, though, it may be best to simply forget about it. Its nice of the molders to attempt such a thing, and it is good advertising for every one in the industry, but it seems to us that the raw material people should do it themselves,—in fact should have done it long ago.

Molders Discuss Problems

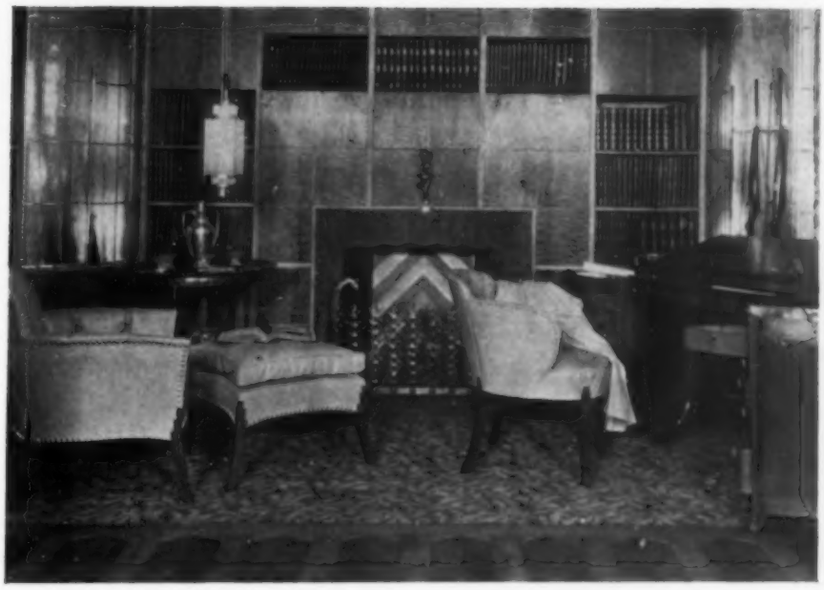
Partly because of the fact that too short notice was given for the molders meeting, and partly because the meeting was held on Good Friday, only 21 men were present at East Pittsburgh on March 29th., eight of whom were members of the Westinghouse staff. Frank Shaw, of Shaw Insulator, Mr. Kendall of Mack, Mr. Clarkson of NEMA, Mr. Swan of The Bakelite Corporation, and Mr. Gilmore of PLASTICS made the trip down from New York together, and were met at the plant by Mr. Kempton and Mr. Ott of Westinghouse and Mr. Kurz of Kurz-Kasch. Shortly before ten o'clock they were joined by the following:

Mr. Parker, Union Insulating; Mr. Randall, General Electric; Mr. Neal, Norton Laboratories; Mr. Huidekoper, American Insulator; Mr. Bachner, Chicago Molded; Mr. Schlesinger and Mr. Fuller, Northern Industrial.

The meeting was called to order at ten-fifteen by the President, Mr. Kurz, and the question of the name contest was the first business brought up. Following this, the section discussed and, in one or two cases, approved other resolutions and

(*Continued on page 230*)

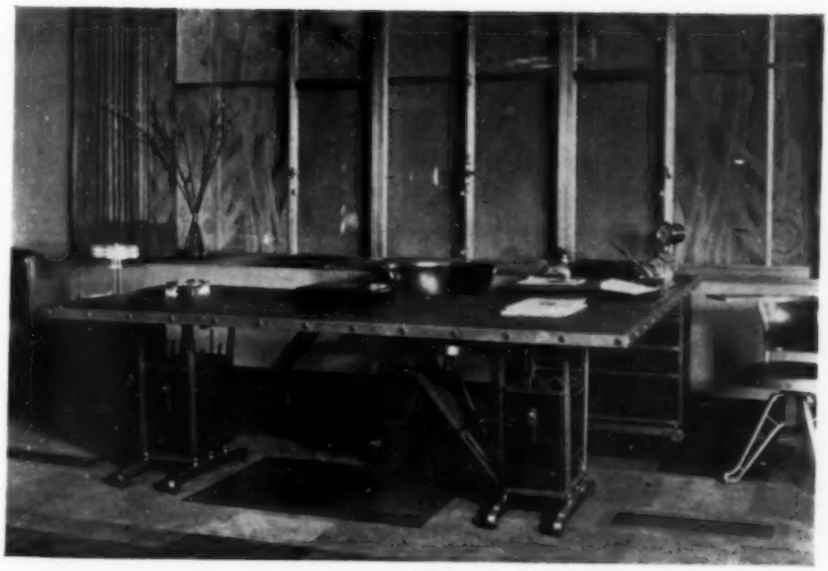
will plastics find a place in modern decor?



a man's study for a country house by ralph t. walker

apartment house loggia by raymond m. hood

detail from bath and dressing room by ely j. kahn



detail from business executives office by raymond m. hood

industrial art in plastics faces this trend

Photos Courtesy of Metropolitan Museum of Art.

Molding Industry Will Be Widely Represented At Chemical Exposition

THE Twelfth Exposition of Chemical Industries, which is due to open at the Grand Central Palace in New York City on May 6th, is being looked forward to by everyone interested in chemical technology, the Plastic industry whole-heartedly cooperating.

The progressive concerns, interested in one phase or another of the synthetic composition field either in the way of materials, finished articles or equipment, have reserved booths at which they intend displaying their products.

Mr. Charles F. Roth, General Manager of the Exposition, in a letter to Plastics and Molded Products confesses that he is astonished to see the number of exhibitors who are affiliated with the plastic industry.

"I have examined our list of exhibitors and the directory now being prepared from the products which they will show in the coming Exposition, and I was quite astonished to see the number of exhibitors, who are manufacturing plastics who will be here. They range from phenolic resins through casein molded products to celluloid and cellulose acetate and various other types of cellulose products which are formed out of solutions.

"There are also molded products of hard rubber. This possesses, as you know, some properties which the former products do not, although the phenolic resins or phenol-formaldehyde condensation products as they are better known in the scientific world possess properties which hard rubber does not, and can be used in almost every case where hard rubber can.

For me to tell you the types of exhibits which will be included here, would be rather difficult, because you are familiar with these but I should like to mention that among the exhibitors the Celeron Company mentions that they will have an exhibit of silent laminated gears.

The Celluloid Company will show a number of its finished celluloid materials, cellulose acetate products, plasticizers which are used in the celluloid lacquers and which truly ought be considered in conjunction with plastics and synthetic pearls. Speak- of plasticizers, Kuttroff, Pickhard & Co., and Robinson, Butler & Hemingway Co. will also show plasticizers. Casein plastics in all their various forms and products as applied in industry and art will be shown by Erinoid Co. of America and Karolith Corp.; phenolic resins will be represented by Bakelite Company, General Plastics Co. and Celeron Co; hard rubber will be demonstrated by American Hard Rubber Company and Luzerne Hard Rubber Company; pyroxylin plastics will be demonstrated by the Celluloid Corporation and among the final exhibits which are closely related is an exhibit of raw material used in the plastic industry,—the Becker-Moore Company will show and demonstrate wood flour.

We should not, by any means, overlook the exhibit which your own Mr. Gilmore plans making that will demonstrate the size, scope and importance of the

(*Continued on page 234*)

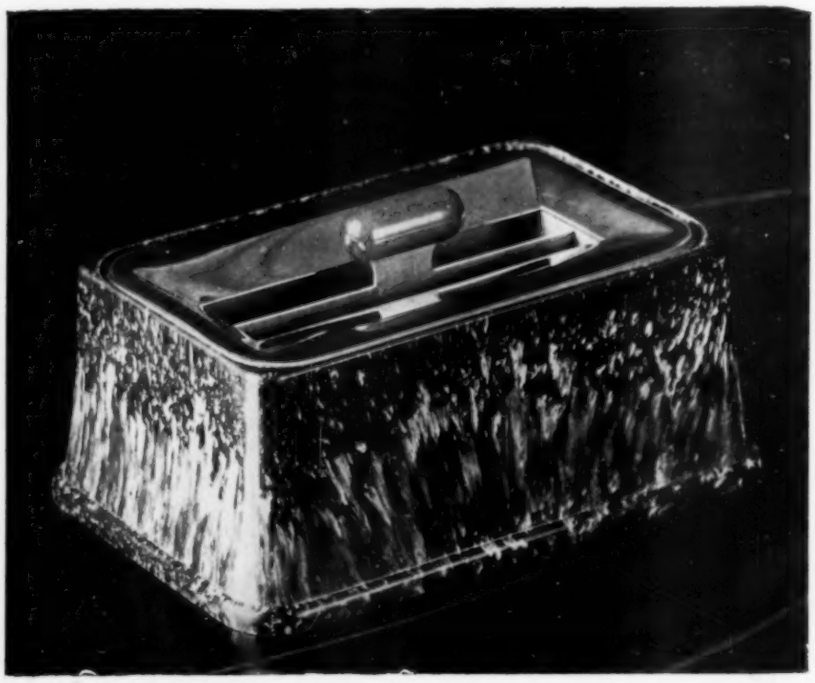


Photo courtesy of Bakelite Corp.

Beauty and convenience are embodied in this smart Smokerset Ash Receiver with mottled molded base and green transparent knob.

Big *or* little...

INTRICATE or simple . . . each finished casting turned out in SCRANTON plants gets the same care, and shows the same finish, uniformity and precision.

SCRANTON moulding has led for forty years in moulding service to all industries, and with the world's biggest and best-equipped plants welcomes each new job with a confidence born of successful experience.

Having this undisputed advantage, SCRANTON can place its engineers at your disposal for any problem in the use of plastics, and assure you of an economical solution. The range of materials—Bakelite, "Lacanite," and "Phenolic"—meets all needs.

SCRANTON MOULDS

retained by us are always repaired, insured and renewed, if necessary, without additional expense to the customer unless otherwise agreed.

THE SCRANTON BUTTON CO.

Plants at SCRANTON, PA., *and* AUBURN, N. Y.

NEW YORK, N. Y.
50 Union Square

SCRANTON, PA.
419 Cherry St.

CLEVELAND, O.
4900 Euclid Bldg.

CHICAGO, ILL.
645 Washington Boul.

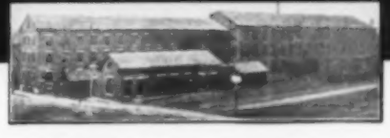
DETROIT, MICH.
114 East Lawn Ave.

AUBURN, N. Y.
40 Washington St.

SCRANTON

The world's largest and newest-equipped moulding plants

Main offices and plant, Scranton, Pa.



Auburn Plant, Auburn, New York

NEWS OF THE INDUSTRY

A. E. Pitcher Elected Vice-President of Du Pont Viscoloid Co.

Announcement has been made that Mr. A. E. Pitcher has been elected vice president of the Du Pont Viscoloid Company. He was formerly director of sheeting sales of that company. He has had a wide experience in the plastics industry, having entered it in 1910 in the employ of the Arlington Company, which was afterwards taken over by du Pont interests. He has been sucessively salesman, manager of the Chicago sales office, assistant director of sales and finally director of sheeting sales.

It is also announced that Mr. W. A. Joslyn, formerly sheeting sales manager, is appointed director of sheeting sales. He entered the service of the du Pont Company in 1903 in a clerical capacity and was later manager of the San Francisco sales office. He was assistant director of sales of the du Pont Export Company when that company was formed shortly after the war, finally becoming general sales manager of it. He became associated with the Pyralin division of the company in 1922 and later became sheeting sales manager of the du Pont Viscoloid Company.

Mr. C. H. Leach, formerly New York district sales manager, was appointed sales manager of sheeting sales. Mr. Leach is widely known in the plastics industry, having been associated with the Arlington Company since 1907 as a salesman and continuing the same work when that organization was taken over by E. I. du Pont de Nemours & Company. He has been manager in charge of Pyralin sales in the New York district since 1921.

Other changes in the organization include the announcement that Mr. J. M. Mack, formerly chief clerk of the Chicago and St. Louis districts, is appointed assistant district sales manager of the present Chicago and St. Louis districts and that Mr. L. B. Gillie, formerly salesman in the New York district, is appointed assistant district sales manager of the New York distrirt.

F. J. Stokes Mach. Co. Reserves Booth at Chemical Show

The F. J. Stokes Machine Company will have on exhibit at the Twelfth Exposition of Chemical Industries one of their new Model "T" Bakelite Preforming Presses in operation making "ball" preforms from Bakelite.

They will show many other products of their compressing machines. Machines of more particular interest to the Chemical and Pharmaceutical trade will also be exhibited.

Du Pont Releases New Style Movie

The du Pont Viscoloid Company announces the release of its new one reel motion picture, "Authentic Art in Milady's Boudoir." This film shows the development of style trends, especially in the toiletware field, using their own new product, Lucite, to illustrate this progress. Part of the reel is in natural color, thus emphasizing the importance of this medium of expression in modern life.

This picture may be obtained, free of charge, by interested parties upon application to the Motion Picture Bureau of E. I. du Pont de Nemours & Company of Wilmington, Delaware.

Monsanto Personnel Takes Over Two Million Dollar Group Insurance

Practically the entire personnel of the Monsanto Chemical Works, drug and chemical manufacturers, with main offices in St. Louis, Mo., is participating in a group insurance program which combines $1,225,000 of life insurance, with approximately $1,225,000 of accidental death and dismemberment protection, all of which is supplemented by health and accident benefits.

The contract is being underwritten by the Metropolitan Life Insurance Company, and features the cooperative method of paying premiums. Under this arrangement, the employer shares the cost with the employes. Besides those in St. Louis, the program covers employes in East St. Louis and Chicago, Ill., and Norfolk, Va.

Individual benefits are based on salary, the life insurance ranging from $1,000 to $8,000, and the dismemberment insurance from $1,000 to $5,000. Health and non-occupational accident benefits are on the same basis and range from $7.50 to $40 a week. These payments will be made when an employee is unable to work due to sickness from any cause, or from injury received while off duty.

Should death be the result of an accident, the full amount of an employee's life insurance, together with the accidental death insurance, will be paid. Full indemnity is payable for the accidental loss of any two members and half that amount for the loss of one. Should total and permanent disability result from any cause before age 60, an employee will be paid the full amount of his life insurance, with interest, in monthly installments.

New European Methods

(*Continued from page 218*)

ers, including the Allegemeine Elektricitats Gesellschaft, Siemens-Schuckertwerke, etc.

Acid-Resisting Plastic

Another comparatively new product, "formite," is now supplied in lump or sheet form. Formite plastics become soft on heating and are exceptionally useful as packing and jointing materials in all kinds of chemical plant required to resist acids, and as packing for steam joints. These products are supplied with any mineral filler suited to the purposes of the particular industry in which it is proposed to utilize them. Formite cements are used in the form of viscous liquids made from appropriate synthetic resins. They are used as binding and adhesive materials for porcelain, china, and similar materials and they can be incorporated with suitable fillers. For hardening the cements are baked for several hours at temperatures varying from 60 deg. to 120 deg. C.

Several grades of formite and bakelite are made suitable for use as spirit varnishes. These resins go from pale amber to brown in color, and closely simulate in appearance and properties natural colophony. They are made up in the cold in industrial alcohol and, after using, the material to which they have been applied requires baking at about 130 deg. C. to harden after removal of the solvent. Formite varnishes find their chief use for insulating coils and windings, where they can be impregnated and baked in their final position. The majority of acids and chemicals do not affect them.

Style in the Molded Products Industry

(*Continued from page 220*)

achieved through judicious regard of the dictates of style.

Yet realizing this, as we all most assuredly do, there still remains a non-understandable apathy to style on the part of too many molders.

Let the molder devote more time—and it will be time well spent— to this all-important subject of style. Let him make a serious effort to feel the pulse of public demand. Study the novelty creations that are constantly being born abroad and that can be adapted to the American trade. Invade, if necessary, the domains of other industries to secure for molded parts the acceptance which potentially it merits. Endeavor to meet the constantly increasing demand for novelty creations of all types—to merchandise these creations with the aggressive forces of educational publicity and advertising. In short, the progressive custom molder will make it his business to court seriously that fickle yet always bountiful mistress, whom we call "Style", to the end that his business may increase and his profits grow more plentiful.

News

Mr. Ray Belmont Whitman announces the removal of his offices from 55 West 42 St., to larger quarters in the new New York Central Building, 230 Park Avenue, New York City, where he continues his practise as a Patent and Trade Mark Attorney and Consulting Engineer. Mr. Whitman was for six years chief patent attorney for the Columbia Phonograph Co. His new book "Patents: How to Get and Sell Them" is now ready for distribution and is available gratis to anyone who writes for it.

N. E. M. A. Meeting

(*Continued from page 222*)

measures in regard to the forthcoming Trade Practice Conference, and heard a brief report from Mr. Kempton on the A. S. T. M. test methods for molded products. The section passed a resolution whereby monthly statistics in dollars and cents value will be collected from member companies, starting with January 1929, and a summary will be furnished to each company reporting. This is to be handled by NEMA in the same way they are now doing with other industries.

Westinghouse Plant Seen

At 1:15 P. M. a lunch was served in one of the Westinghouse restaurants, and shortly afterwards the section started on a tour through the forge shop, power plant and molding department. Although we would like to mention all of this completely, yet we are obliged to go directly to a brief summary of the molding plant. Entering the experimental molding room first, we were able to see some of the reasons in back of Westinghouse's high grade output. Various tests were being conducted on flow etc., and we were very much interested in a Boomer & Boschert Press, now 14 years old and still going strong! Such service is the best salesman a concern can have. A long visit in the molding room (where Mr. Randall seemed to be extremely interested in laminated stock) convinced us that we would need a whole day or more to do the plant justice. There must have been ten of the large Burroughs presses in operation, and any number of other makes of machinery, including a Colton preformer. These were all functioning perfectly, and were laid out with a great deal of system. A variety of articles were being molded, although over 90% of the entire output is used in their own consumption, and we saw several things, including trays, that interested us greatly. Also some Carboloid used for cutting and trimming.

Westinghouse spends a great deal of time and money exerting safety measures for its employees, and we believe that it is always money well spent, even in a smaller organization. The molding is done accurately, economically and safely, even though production is rapid. We were glad of an opportunity to see the plant, and look foreward to an even more detailed inspection in the future. And, oh! yes! They gave us all a souvenir made out of "Moldarta"!

We then boarded automobiles and took an enjoyable ride around and through Pittsburgh, ending up for a dinner at the Pittsburgh Athletic Club. And it was some dinner! Our hosts out-did their previous hospitality and provided everything going to make the day one of the most successful ever. Following the dinner, Mr. Kurz introduced the speakers,—Messers Snow, Gilmore, Clarkson, Randall, Fuller, Bachner and Kendall, each of whom spoke briefly, expressing their appreciation of the day's hospitality and their ideas for the future welfare of the molders under the association. Mr. Kempton and Mr. Ott also talked briefly on the future of the industry, outlining it in such glowing terms that they fully expressed the thoughts and hopes of everybody present.

The New York delegation, having to leave at 9:30, rather broke the party up early, but we cannot be definitely certain of that until we see all the survivors at the next meeting before the Federal Trade Commission.

R. C. G., Jr.

Pyroxylin Plastics in Japan

(*Continued from page 220*)

one in Tokio. These cartels have as members all the small productive units. The Dai-Nippon Celluloid Company, the largest single factor in the industry, however, operates entirely independently.

Ownership Statement

Statement of ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912 of Plastics published monthly at Washington, N. J., for April 1, 1929.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared R. C. Gilmore, Jr., who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Plastics Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Plastics Publications Inc., 114 E. 32nd Street, New York City; editor, Carl Marx, 114 E. 32nd Street, New York City; managing Editor, R. C. Gilmore, Jr., 114 E. 32nd Street, New York City; business manager, R. C. Gilmore, Jr., 114 E. 32nd Street, New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member must be given.) Plastics Publications Inc.: R. C. Gilmore, Jr., 114 E. 32nd Street, New York City; R. C. Gilmore, Sr., 114 E. 32nd Street, New York City; Carl Marx, 114 E. 32nd Street, New York City; A. K. Gilmore, 114 E. 32nd Street, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent of total amount of bonds, mortgages, or other securities are: Sylvan Hoffman, 114 E. 32nd Street, New York City.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is .....
(This information is required from daily publications only).

R. C. GILMORE, JR.
Business Manager.

Sworn to and subscribed before me this 26th day of March, 1929.

(SEAL) JAMES J. DOOLEY.

My commission expires March 30, 1930.

'Chemical Markets' Discusses Unprecedented Activity in in Phthalic Anhydride

At an' average price of 17c per pound, phthalic anhydride is one of the cheapest organic acids available, according to J. M. Selden, Jr., vice president of the Selden Co., writing in this month's issue of Chemical Markets.

"Development of the use for phthalic anhydride during the past ten years has been increasingly rapid and interesting in nature," according to Mr. Selden, who says that prior to the war its uses were limited to the dyestuffs industry, chiefly in Germany. Demand here was necessarily small owing to the fact that finished dyes were then imported instead of manufactured here. He continues:

"During the war imported dyestuffs dropped off considerably and, therefore, the Government took steps through the Bureau of Chemistry to investigate the manufacture of dyestuffs, starting with raw materials. This work was carried on extensively by the Color Laboratory under the direction of Dr. H. D. Gibbs.

Direct Oxidization

"One of the most important discoveries during this period of research was the process for producing phthalic anhydride by the direct oxidation of naphthalene with air over a catalyst. This discovery was the nucleus for an industry which has grown rapidly since that time, which growth has been largely due to the efforts of several companies toward commercializing this process.

After reviewing the various processes employed up to the year 1918, when phthalic manufactured by the air oxidation process was first placed on the market, Mr. Selden says that the market price fell over 32 per cent to an average of $2.85 per pound from the previous year, the direct result of the new process. He continues:

Output Gains Rapidly

"Year by year we find the production increases by leaps and bounds, and at the same time the market price shows a rapid and steady decrease. In 1922 the production increased to 1,629,182 pounds with an average price of 35c per pound; in 1924 the production was 2,787,308 pounds with an average market price of 24c per pound; in 1926, 4,379,108 pounds, with an average price of 18c per pound; and in 1927, 4,549,820 pounds, with an average price of 17c per pound. There are no production figures as yet available for 1928, but a fair estimate will bring this figure close to 6,000,000 pounds.

"At an average market price of 17c per pound, phthalic anhydride is one able. It might be well for no research of the cheapest organic acids availorganization to overlook this moderate-priced organic acid as the development of the new processes for the use of phthalic anhydride in the next ten years bid fair to assume large proportions."

Advertisers Index

New Booklet on Pyralin Sheeting

THE Du Pont Viscoloid Company, New York City, has just issued an elaborate and informative brochure on Pyralin. It is intended for the guidance of manufacturers who use thin plastic in the fabrication of a great variety of articles for which it is peculiarly adapted. The book also aims to suggest uses of the plastic in other manufactures where it could be used to advantage either as a basic material or for decorative purposes.

Besides describing the chemical and mechanical processes involved in the making of Pyralin, the pages are replete with illustrations and data on the physical properties of the material and most approved methods of machining, molding and otherwise working it.

An extensive list of widely diversified uses of Pyralin brings to the reader's attention the fact that, in considerable measure, Pyralin possesses many desirable properties.

Staff Change

PLASTICS Publications, Inc. announces at this time the appointment of Mr. Nicholas Klein Chie., as associate editor in charge of Molded Products, to succeed William Gruen, who has resigned. This change in the staff takes place with the current issue of Plastics and Molded Products.

Mr. Klein brings to Plastics, and to the Molded Section especially, a broad understanding of conditions in the molding industry, a wide range of acquaintances in the trade, practical experience in the cellulose ester end of affairs, and a wholehearted enthusiasm for making the publication as useful and interesting as possible to its readers.

Book Reviews

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solutions in grams per liter, pounds per cubic foot and pounds per gallon.

A section on ceramics has been been added, including data on raw materials, factors for calculating properties of glasses, end points and intervals for pyrometer cones, and the dimensions of sieves of the standard screen scale.

Another addition of special interest is the ethyl alcohol table giving the specific gravity of aqueous solutions referred to water at the same temperature.

Chemical Exposition

(*Continued from page 224*)

plastics and moulded products industry in the charts which he will have on display.

In this discussion we should not overlook the fact that there will be exhibitors here who have presses and machines used in making plastic compositions or other materials used in plastics.